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Monthly Message

"SPIT"

I invite your attention to an excellent article by Dr. Frank L. Meleney, entitled "The Past Fifty Years in the Management of Surgical Infections," in *Surgery, Gynecology and Obstetrics,* 100: 1, January 1955. It is filled with interest, some humor, and much instruction as it covers the history of the past half century. In it he quotes an article by Dr. Willis G. MacDonald which appeared in 1906, "Practical Bacteriological Studies in the Surgical Clinic," in which Dr. MacDonald points out the dangers in the spread of surgical infections by the spray from the mouth. I remember vividly in my own undergraduate days the attitude of the late Dr. Harvey Cushing toward any of his assistants who coughed or sneezed or even laughed heartily while operating. They were admonished in no uncertain terms to step away from the table and turn their head and if they had a cold they were not allowed at the operating table.

In World War I the same danger of spread of infection from mouth organisms and carriers of streptococci in the throat and nose was noted both in the British and American armies.

Unfortunately, in recent years, particularly since World War II and the advent of the antibiotics, there has been increasing carelessness on the part of the operating surgeons and their assistants, so that now it is not uncommon to see them cough directly into the wounds without a thought of stepping back or turning their heads. Apparently they rest safe in the arms of a false belief of a huge umbrella of protection by the antibiotics, forgetting the very essentials of the principles of surgery and the spread of infection. I was brought up in the era of World War I and participated in the examinations of the throat and pharynx of many hundreds of troops so as to weed out the carriers of meningococci and hemolytic streptococci, and ever since then I have been acutely conscious of these dangers. A single mask does not afford complete protection to the wound from the nose and throat of the operators, but even if it did, it is but common courtesy to turn one's head away when coughing or sneezing; the mask should cover both *mouth and nose*. And now from the purely practical standpoint this becomes all the more important in view of the resistance of many organisms to antibiotics.

Frank B. Berry

FRANK B. BERRY, M.D.
Assistant Secretary of Defense
(Health and Medical)

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Foreword

The *United States Armed Forces Medical Journal* is the medium for disseminating information of administrative and professional interest to all medical personnel of the Department of Defense. The Assistant Secretary of Defense (Health and Medical) and the Surgeons General of the several services invite all medical officers, dental officers, Medical Service Corps officers, Nurse Corps officers, and officers of the Veterinary Corps of the Armed Forces, and the medical consultants of the Army, Navy, and Air Force to submit manuscripts for publication in this *Journal*.

FRANK B. BERRY, M. D.,
Assistant Secretary of Defense (Health and Medical).

MAJOR GENERAL SILAS B. HAYS,
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UNITED STATES ARMED FORCES
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COMPARATIVE METHODS OF ARTIFICIAL RESPIRATION

Study of Living and Dead Subjects With and Without Gas Mask

ARCHER S. GORDON, *M. D., Ph. D.*
CHARLES W. FRYE, *M. S.*
ROBERT D. MILLER, *M. S.*
GORDON M. WYANT, *M. D.*

DURING the past several years improved manual methods of artificial respiration have been adopted by the Armed Forces, American Medical Association, American Red Cross, U. S. Public Health Service, Federal Civil Defense Administration, and other national and federal groups concerned with resuscitation. This action followed an intensive research program co-ordinated under the Department of Defense by the Chemical Corps Medical Laboratories.[1]

Four research groups carried out studies on warm, nonrigid corpses;[2] normal adults curarized-anesthetized to apnea;[3-6] apneic, anesthetized patients prior to surgical procedures;[7] patients who were apneic due to intracranial lesions or other pathologic conditions;[8] and normal trained persons.[9] All of these investigations were corroboratory in revealing that methods which produce both active inspiration and active expiration, so-called "push-pull" methods, result in more than twice as much pulmonary ventilation as methods which only produce active expiration (Schafer prone pressure) or active inspiration (Emerson hip lift). Three of the push-pull methods were found to be almost equally effective. These were the back-pressure arm-lift (modified Holger Nielsen), hip-lift back-pressure (Schafer-Emerson-Ivy), and arm-lift chest-pressure (Silvester). Further tests indi-

From the Department of Clinical Science, University of Illinois College of Medicine, Chicago, Ill.

This study was supported by a grant from the Chemical Corps Medical Laboratories, Army Chemical Center, Edgewood, Md.

cated that all of the push-pull methods are capable of maintaining arterial oxygen saturation at near normal levels.[10]

The hip-lift back-pressure method is difficult to perform for long periods of time by a single operator,[11-14] and the Silvester method results in frequent obstruction of the airway because of the supine position.[2] The back-pressure arm-lift method, therefore, was selected as best for general use. The hip-lift back-pressure and Silvester methods should be applied when specific conditions indicate their use or prevent performance of the back-pressure arm-lift.

Anticholinesterase (nerve gas) poisoning requires prompt treatment of the patient with injections of atropine sulfate, and artificial respiration.[15] In field situations the manual methods will have to be used initially until mechanical resuscitation equipment and oxygen become available. This raises the question will push-pull manual methods satisfactorily ventilate casualties wearing gas masks in a contaminated atmosphere? The current study was designed to resolve that question.

METHODS

Manual methods of artificial respiration were studied on: (a) normal adults who were curarized-anesthetized to total apnea; and (b) warm, nonrigid corpses. Determinations were made first without and then with the subjects wearing a standard M-9 gas mask equipped with an M-11 cannister.

Studies on Normal Adults. Seven normal adult male students were studied during total apnea induced with mixtures of curare and anesthesia. Their ages ranged from 21 to 28 years and their weights from 135 to 205 pounds. Normal resting tidal volume and vital capacity were determined before and after the application of the standard Army gas mask and cannister. Each subject was then anesthetized and curarized by the method previously described by this group.[16] A cuffed endotracheal tube was inserted into the airway and the subjects were maintained in the apneic state by controlled breathing and further anesthetic agents. The subject's respiration was at all times under the control of either the anesthetist or the operator performing artificial respiration.

Each of the three push-pull manual methods was then applied. The prone and supine Eve rocking methods were also evaluated. The gas mask and cannister were then placed on the subject and the methods were repeated. In each series the sequence of application of the methods was rotated.

Ventilation was measured by means of a carefully balanced respirometer. During performance of the methods on subjects

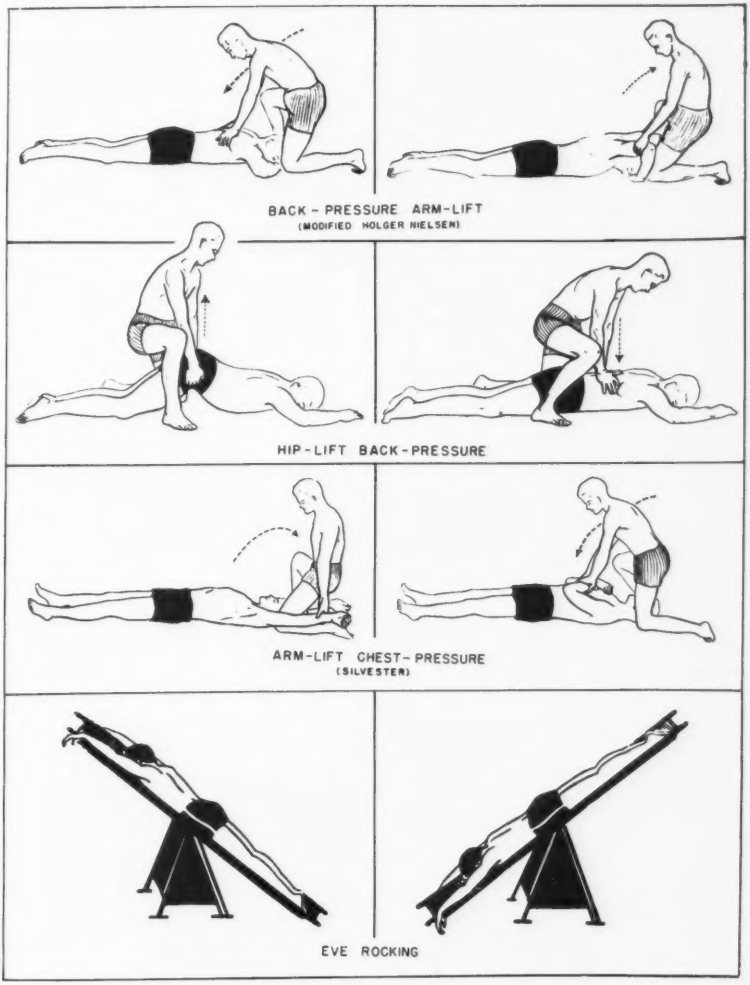

Figure 1. Technics of the four methods of artificial respiration used on normal adults and on warm, nonrigid corpses.

wearing the gas mask, intramask pressure was recorded by means of electromanometer transducers.

Studies on Corpses. Similar measurements were made on 13 warm, nonrigid corpses immediately after death and before the

TABLE 1. *Pulmonary ventilation with various methods of artificial respiration on curarized-anesthetized normal adults*

State	Variation	Method		Ventilation (cc. per cycle)							
				Subjects							Mean
				1	2	3	4	5	6	7	
Conscious	No gas mask	Tidal volume		452	473	497	745	414	559	619	537
		Vital capacity		4,430	5,382	3,788	4,388	4,533	4,512	3,498	4,362
	M-9 gas mask	Tidal volume		476	611	645	783	481	597	840	633
Anesthetized and curarized to apnea	No gas mask	Hip-lift back-pressure (Schafer-Emerson-Ivy)		1,366	1,470	1,035	1,283	1,028	1,511	1,035	1,249
		Arm-lift chest-pressure (Silvester)						1,254	1,304	952	1,170
		Back-pressure arm-lift (Holger Nielsen)		1,325	1,573	952	911	892	1,416	795	1,123
		Eve rocking	Prone	455	911	414	414	559	787	476	574
			Supine					352	487	331	393

TABLE 1. *Pulmonary ventilation with various methods of artificial respiration on curarized-anesthetized normal adults*—Continued

State	Variation	Method		Ventilation (cc. per cycle)							
				Subjects							Mean
				1	2	3	4	5	6	7	
Anesthetized and curarized to apnea —*continued*	M-9 gas mask equipped with M-11 cannister	Hip-lift back-pressure		662	849	890	952	1,138	1,167	1,159	974
		Arm-lift chest-pressure						1,118	890	828	945
		Back-pressure arm-lift		559	455	890	890	1,304	882	869	836
		Eve rocking	Prone	290	911	455	579	393	393	646	524
			Supine					207	248	559	338

onset of postmortem changes. Adequate comparative data were collected on only eight of these. In each case the methods of resuscitation were rotated and were performed with the corpse wearing the standard gas mask and cannister. Two sets of determinations were made, first with a cuffed endotracheal tube in place, and then without the endotracheal tube.

All methods were performed by the same operator on the curarized-anesthetized subjects and by one of two operators on the corpses. Each method was performed at a standard rate of 12 times per minute. The technics for the back-pressure arm-lift, hip-lift back-pressure, Silvester, and prone and supine Eve methods have been described in detail elsewhere[1,3,5] and are illustrated in figure 1.

The M-11 cannister is standardized with a limit of resistance of 75 mm. of water at a flow of 85 liters per minute.

RESULTS

Studies on Normal Adults. The ventilatory values obtained on all subjects are shown in table 1. The tidal volume of each of the subjects was slightly increased while wearing the gas mask. This was attributed to slight hyperventilation resulting from the increased resistance to breathing imposed by the mask. All of the push-pull methods produced more than twice as much ventilation per cycle as the normal resting tidal volume. These data are comparable to those obtained in previous studies on curarized-anesthetized normal subjects. The prone Eve gave only one half and the supine Eve only one third as much ventilation as the push-pull methods.

Application of the gas mask and cannister reduced ventilation in all of the push-pull methods. However, it remained at a level one and one-half times the resting tidal volume. The values for the prone and supine Eve method were reduced only slightly.

The mean normal resting intramask pressure differentials in the conscious subjects ranged from plus three to minus three mm. Hg (table 2). The expiratory intramask pressure was the same for all of the push-pull methods and the prone Eve method. The hip-lift back-pressure resulted in the greatest intramask inspiratory pressure, and the other two push-pull methods had slightly less. With the Eve method, the inspiratory intramask pressure was less than with the push-pull methods. Both the inspiratory and expiratory intramask pressures were reduced during the supine Eve method.

TABLE 2. *Intramask pressures during various methods of artificial respiration on curarized-anesthetized normal adults*

Variation	State	Method		Pressure differential (mm. Hg)													
				Subjects												Mean	
				1		2		3		4		5		6			
				Expiratory	Inspiratory	Expiratory	Inspiratory	Expiratory	Inspiratory	Expiratory	Inspiratory	Expiratory	Inspiratory	Expiratory	Inspiratory	Expiratory	Inspiratory
M-9 gas mask equipped with M-11 cannister	Conscious	Tidal volume		+2	−3	+5	−4	+4	−3	+1	−1	+2	−3	+3	−3	+3	−3
	Curarized-anesthetized to apnea	Hip-lift back-pressure		+4	−3	+5	−9	+5	−9	+4	−1	+4	−5	+3	−5	+4	−6
		Arm-lift chest-pressure								+4	−4	+3	−4	+4	−5	+4	−4
		Back-pressure arm-lift		+4	−3	+3	−7	+6	−8	+3	−4	+3	−2	+3	−4	+4	−5
		Eve rocking	Prone	+3	−1	+6	−4	+6	−5	+2	−2	+3	−3	+3	−3	+4	−3
			Supine							+2	−2	+2	−2	+3	−2	+2	−2

TABLE 3. *Ventilation obtained with various methods of artificial respiration*

Method		Ventilation (cc.)			
		Seven anesthetized-curarized normal adults		Eight warm, nonrigid corpses	
		Endotracheal tube		Wearing M-9 gas mask	
		No gas mask	M-9 gas mask	Endotracheal tube	No endotracheal tube
Hip-lift back-pressure (Schafer-Emerson-Ivy)	Mean	1,249	974	545	510
	Range	(1,028 - 1,511)	(662 - 1,167)	(124 - 911)	(75 - 890)
Arm-lift chest-pressure (Silvester)	Mean	1,170	945	512	480
	Range	(952 - 1,304)	(890 - 1,118)	(91 - 1,014)	(54 - 994)
Back-pressure arm-lift (Holger Nielsen)	Mean	1,123	836	442	419
	Range	(892 - 1,573)	(455 - 1,304)	(124 - 1,027)	(41 - 799)

TABLE 3. *Ventilation obtained with various methods of artificial respiration*—Continued

Method			Ventilation (cc.)			
			Seven anesthetized-curarized normal adults		Eight warm, nonrigid corpses	
			Endotracheal tube		Wearing M-9 gas mask	
			No gas mask	M-9 gas mask	Endotracheal tube	No endotracheal tube
Eve rocking	Prone	Mean	574	524	-	213
		Range	(414 - 911)	(393 - 646)	-	(40 - 509)
	Supine	Mean	393	338	-	160*
		Range	(331 - 497)	(207 - 559)	-	(0 - 186)

*Ventilation in only three of eight corpses.

Studies on Corpses. The ventilatory values obtained on the corpses were about one half of those obtained with the curarized subjects; however, the relative values between the various methods are the same. This same relationship between data on corpses and on curarized subjects was noted in previous tests.[2-4] The push-pull technics gave the same relative results and all were more than twice as efficient as the Eve methods. When an endotracheal tube was not used, the pulmonary ventilation was somewhat reduced, but all methods except the supine Eve method resulted in ventilation in all cases. With the supine Eve method, the mean tidal volume was only 160 cc., and in five of the eight corpses no ventilation was obtained.

DISCUSSION

In this series of tests, application of the various methods of artificial respiration without the gas mask produced results which duplicate those obtained in previous studies. When the gas mask and cannister were used, the push-pull methods retained their effectiveness. In curarized subjects, pulmonary ventilation with these methods was one and one-half times the resting tidal volume despite the resistance offered by the mask and cannister. These findings held for individual subjects as well as for the over-all group. In corpses, the values were almost the same as obtained in previous studies, and about one half as much as obtained in normal curarized subjects. Although the absolute values are reduced, the relative values between the methods are essentially the same. With all of the push-pull methods, use of the gas mask without an endotracheal tube resulted in ventilation in all cases with only a slight reduction in volume.

The prone Eve method produced only one half as much ventilation as the manual push-pull technics, and only one third as much with the supine position. This held for both the curarized subjects and the corpses without an endotracheal tube. Only three of eight corpses were ventilated with the Eve supine method.

These findings are related to the airway pressure differentials resulting with performance of the various methods. The hip-lift back-pressure method creates the greatest inspiratory intramask pressure and results in the most ventilation. All of the push-pull methods exceeded the Eve methods as regards intramask pressure differentials, and produced greater ventilation. Because airway resistance and cycling rate were constant for all methods, increased intramask pressure differentials would result in increased air-flow rate. Cycling rate being the same for all methods, an increased flow rate results in an increased vol-

ume per cycle. This accounts for the greatest ventilation with the hip-lift back-pressure method and greater ventilation with the other push-pull methods than with the Eve methods.

With a clear airway, the back-pressure arm-lift method is adequate for overcoming the resistance of a standard gas mask with cannister and for producing artificial ventilation of a casualty wearing them in a contaminated atmosphere. Increased airway resistance may result from respiratory secretions and/or bronchoconstriction following anticholinesterase poisoning. The hip-lift back-pressure method offers the best possibility of overcoming this resistance because of the greater intramask pressure differential it creates. It may be necessary to use this method until airway resistance has been relieved by aspiration, postural drainage, and administration of atropine sulfate. Then the back-pressure arm-lift method may be used because it is easier to perform for a prolonged period of time.

Recent investigations[17, 18] have indicated that mouth-to-mouth insufflations (or mask-to-mask insufflations in a contaminated atmosphere) can be performed for long periods of time, and will maintain adequate ventilation and normal blood gas tensions. In victims with increased airway resistance, the positive inflating force of the operator's expiration may be more effective than the manual methods for overcoming resistance.

Although the prone Eve method provides less ventilation and requires the use of equipment (either provided or improvised), it is suitable if it becomes necessary for a few persons to resuscitate many victims simultaneously. By lashing together several standard Army stretchers, one person can effectively rock and ventilate several persons at one time.

Maintenance of a clear airway is essential with all of these methods.

SUMMARY

Tests on totally apneic, anesthetized-curarized normal adults and warm, nonrigid corpses indicate that all push-pull manual methods of artificial respiration are effective for ventilating casualties wearing a standard M-9 gas mask equipped with an M-11 cannister.

The hip-lift back-pressure method creates the greatest intramask pressure differential and should be most effective when there is increased airway resistance, such as occurs with bronchoconstriction or excessive airway secretions resulting from anticholinesterase poisoning. If the airway is clear, the back-pressure arm-lift method provides almost as much ventilation and is easier to perform.

The Silvester method (arm-lift chest-pressure) produces as much ventilation and should be used when it is necessary to keep the patient in the supine position.

Mouth-to-mouth (or mask-to-mask) insufflations may be effective in ventilating casualties with increased airway resistance.

The prone Eve method gives about one half as much ventilation as do the push-pull manual methods. In addition it requires a rocker, either provided or improvised. For resuscitation of many persons by a few operators it may be necessary to fasten together several stretchers for simultaneous rocking by a single operator.

Maintenance of a clear airway is of paramount importance for adequate ventilation with any of these methods.

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THE HAIR SHIRT

Physicians wear hair shirts. Perhaps no other group in our society is so self-critical. Physicians are constantly evaluating and re-evaluating their activities, searching for errors that may be corrected and for better ways of operation. . . .

The hazard in this discipline of self-criticism is the hair shirt complex. This is a neurosis characterized by distorted perspective. The victim frets about what is wrong with medical education, forgetting what is right; he grows peevish over the inadequacies of medicine, losing sight of its amazing accomplishments; he rails against the trained incapacity of physicians, losing sight of the extraordinary competence of most. Rage at the occasional abortionist, dope peddler, chiseler, ghost surgeon, or rapist colors his view of the entire profession. His cries are heard in the market place. This disease is an occupational hazard in medicine. Teachers, medical writers, and frustrated idealists are especially susceptible. It is communicable. Its virulence is greatly increased by animal passage through free-lance magazine writers who spread a malignant variant among the literate. Large doses of medical history are curative, but the best treatment is preventive. For the malignant variant which afflicts people who have not been immunized by a formal medical education, prevention is the only practical control measure.

Prevention of the hair shirt neurosis does not involve the assumption that we are paragons in this best of all possible worlds. It does not involve elimination of the useful technique of self-criticism. It does not involve erecting barriers to legitimate medical news. Rather, it involves unemotional honesty to insure that our public utterances and writings are in accurate perspective. Let us discard the hair shirt.

—MILTON R. WEED, M. D.
in *Detroit Medical News,*
p. 6, Mar. 14, 1955

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IS KOREAN SERVICE A HEALTH HAZARD TO CIVILIAN COMMUNITIES?

MYRON G. RADKE, *First Lieutenant, MSC, USAR*
REGINALD C. THOMAS, *Captain, MSC, USAR*
JAMES F. MRACEK, *Captain, MSC, USAR*
CARLYLE NIBLEY, Jr., *Captain, MSC, USA*
ROLAND S. ARONSON, *Lieutenant Colonel, MC, USA*

ON NUMEROUS occasions the question has arisen as to whether or not United States military personnel serving in the Far Eastern theaters would likely become carriers of tropical diseases. It was found at the close of World War II that many returning soldiers had become infected with endoparasites. At the outbreak of the Korean conflict the controversy arose again concerning the possibility of troops returning from this area transmitting these parasitic diseases to the general American population. Craig[1] expressed the following opinion: "The return of these men undoubtedly will cause an increase in such infections in this country and will render a prompt diagnosis imperative if we are to prevent their spread." This controversial question obviously requires much evidence to resolve it; therefore, this study was conducted to give a better understanding of its potentialities.

In this survey a group of food handlers in the Third Army area, including both military personnel with and without Korean service and civilian personnel, was examined for intestinal parasites and enteric pathogenic bacteria. This study area seemed appropriate because in general the southeastern section of the United States has always been considered to have a higher incidence of diseases due to these organisms. The problems prompting this survey were: (a) Are military personnel returning from Korea likely to show higher rates of infection than personnel without Korean service, (b) is the incidence of infection higher in military than in civilian food handlers, and (c) does a racial difference in the rate of infection exist?

MATERIALS AND METHODS

Fecal specimens from 4,438 persons (925 soldiers with Korean service, 2,799 without Korean service, and 714 civilians) were submitted to this laboratory from nine Army installations participating in the survey. According to the instructions given in the

From the Third Army Area Medical Laboratory, Fort McPherson, Ga.

technical manual,[2] each specimen was divided and submitted in two sterile 22-ml. screwtop bottles. One bottle, for bacteriologic examination, contained buffered glycerin saline solution, and the other bottle, for parasitologic examination, contained 10 percent formaldehyde.

On receipt, each fecal suspension in buffered glycerin saline solution was inoculated on two eosin-methylene blue agar plates, two salmonella-shigella agar plates, and one selenite-F broth tube. The following day the eosin-methylene blue and the salmonella-shigella agar plates were examined for typical enteric pathogenic colonies, and the selenite-F enrichment broth was subcultured on two eosin-methylene blue and two salmonella-shigella agar plates. Suspected colonies were picked from all plates and inoculated on Kligler's iron agar. Biochemical studies and typing were performed when the reaction on Kligler's iron agar indicated the presence of a possible enteric pathogen. All plates were incubated for 48 hours before being discarded as negative for enteric pathogens.

Specimens submitted for parasitologic investigation were examined by the direct smear and by the modified ether sedimentation technic (formalin-ether technic) described by Ritchie.[3] All parasitic agents found, both pathogens and nonpathogens, were reported.

RESULTS

Of the 4,438 stool specimens examined, 859 harbored one or more parasitic and bacterial agents. A total of 655 stools had one or more types of protozoa (of which number, 243 harbored a single pathogenic protozoan), and 146 stools had one or more types of helminths; in addition, 51 stools had both protozoa and helminths. Seven stools were positive for a single significant bacterial agent.

In figure 1, graph A compares the total agents recovered from both military and civilian personnel. The military personnel had a higher incidence of infection than did the civilian. Graph C illustrates the various types of infections and shows that the military personnel had a higher rate of parasitic infection but a lower incidence of bacterial infection. The differences in infective agents found between the Negroid and the Caucasian races are represented in graphs E through H (fig. 2). It may be noted that in all instances shown in these graphs, Caucasians had a higher incidence of infective agents than did Negroes. Graph H, however, shows that Negroes had a slightly higher percentage of nonpathogenic protozoa.

The total agents recovered from military personnel, illustrated in graph B, indicate that soldiers without Korean service had a

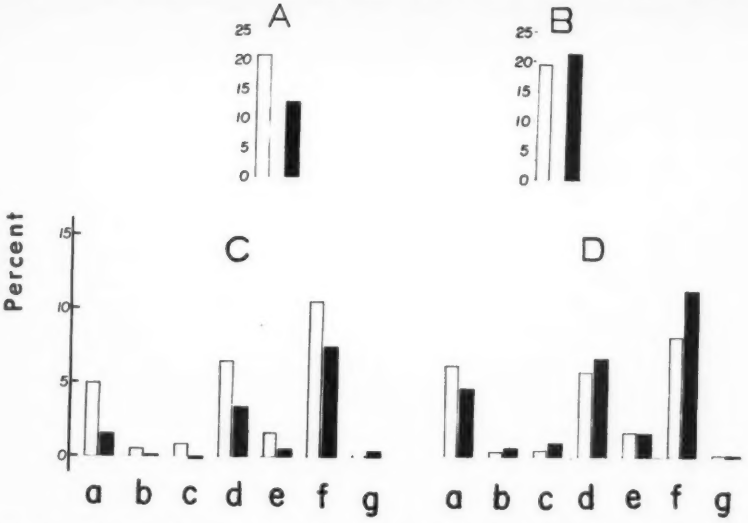

Figure 1. Graphs demonstrating the incidence of various types of parasitologic and bacteriologic agents in the groups studied. *Ordinate:* percent of food handlers. *Abscissa:* types of infective agents, as follows: (a) helminths; (b) helminths and pathogenic protozoa; (c) helminths and nonpathogenic protozoa; (d) pathogenic protozoa; (e) pathogenic and nonpathogenic protozoa; (f) nonpathogenic protozoa; and (g) bacteria.

Graph A. Total agents recovered } { Open bar: military
Graph C. Infective agents } { Filled bar: civilian

Graph B. Total agents recovered } { Open bar: Korean service
Graph D. Infective agents for military personnel } { Filled bar: no Korean service

slightly higher percentage of positive stools than did those with Korean service. A breakdown of infective agents into groups, graph D, indicates that helminth infections were more prevalent in personnel returning from Korea.

DISCUSSION

In this survey a single stool specimen from each food handler was received and examined, but if more than one specimen had been received and examined, a higher percentage of agents would have been recovered.[4]

Hoare[5] stated that a single fecal examination by the zinc sulfate flotation method revealed only 50 percent of the protozoan infections. Ritchie and others[6] compared the formalin-ether technic[3] with the zinc sulfate flotation method. The authors noted a marked superiority of the formalin-ether technic over the zinc sulfate flotation method, there being a higher percent of protozoan cysts, helminth eggs, and larvae recovered by the former method.

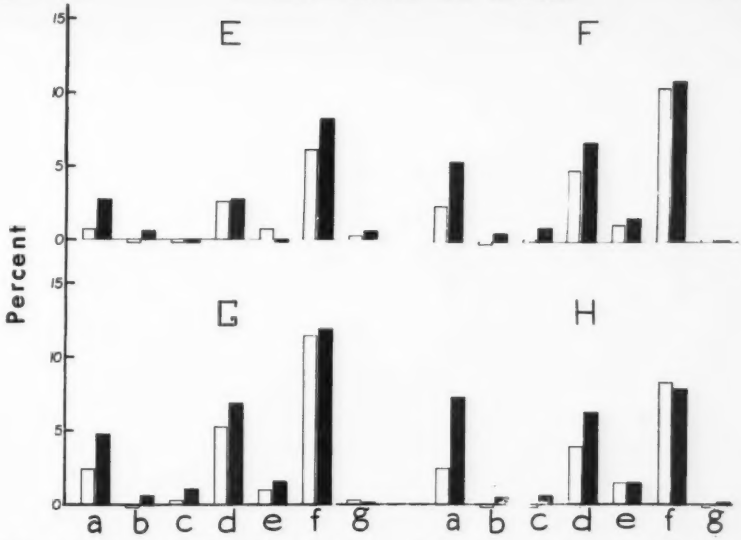

Figure 2. Graphs demonstrating the incidence of various types of parasitologic and bacteriologic agents in the groups studied. *Ordinate* and *abscissa* same as in figure 1. In figure 2 the open bars represent Negroes and the filled bars Caucasians.

Graph E, civilian personnel;
Graph F, military personnel;
Graph G, military personnel without Korean service;
Graph H, military personnel with Korean service.

The graphs in figures 1 and 2 corroborate information presented by Jacobs and associates,[7] who examined 4,000 stool specimens from military personnel native to the same section of the United States as the subjects of this study. Our survey also seems to substantiate Hunter's[8] report in which he stated that parasitic and bacterial infections in military personnel returning from Korea should not constitute a health problem in the United States.

SUMMARY

Single stool specimens from a total of 4,438 military and civilian food handlers from the Third Army area were examined for parasites and enteric pathogenic bacteria. These examinations revealed that about 10 percent of these food handlers were harboring pathogenic agents.

It was noted that the Caucasian race had a higher rate of infection than the Negroid and, similarly, military food handlers appeared to harbor more agents than did civilians with like duties. Military personnel who had Korean service showed a slightly higher incidence of helminth infections, but the total of the agents recovered was higher from military personnel who had no Korean service.

Although this study has been restricted to an examination of 4,438 food handlers, it is apparent that parasitic and bacterial infections in military personnel returning from Korea do not constitute a hazard to existing health conditions in the United States.

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GOOD DOCTORING

More often than not we know, in answering the sudden summons, that we will be able to make little material contribution to the patient's well-being, but we know that our presence will help. When death is inevitable, the doctor doesn't waste his time when he stays by the patient, as even if the patient be too ill to appreciate his presence, his friends and relatives will derive great support. All these and many other less tangible elements in good doctoring cannot be taught as formal items in the syllabus, but they can be inculcated by example. I think it is most important that clinical instruction should involve as long a period as possible during which the student is attached to a physician and at another time to a surgeon. The formal content of his instruction and work will be essentially scientific, but in the day-to-day conduct of clinical practice and in the "chief's" attitude to patients there is much that the student can learn. He will naturally discover that the practice of medicine knows no hours, and the doctor can expect rest and refreshment only when there is absolutely nothing further the patient needs for the time being.

—W. MELVILLE ARNOTT
in *Proceedings of the First World Conference on Medical Education,*
Oxford University Press, 1954, p. 283

SMALLPOX AMONG "VACCINATED" TROOPS

HARVEY H. WALDO, *Major, MC, USA*

ALL AMERICAN military personnel have been vaccinated against smallpox and are considered to possess some degree of immunity against the disease. It is disturbing, therefore, to find that some of these "immune" persons contract smallpox when exposed to the causative agent. Such outbreaks occurred in American military personnel during the occupation of Korea (where smallpox is endemic)[1] and Japan in 1946.[2,3] When the international situation caused American troops to be returned to Korea in 1950, additional cases were reported.[4,5]

During the first six months of 1953, six patients with smallpox were admitted to this hospital. Four of these patients were American soldiers. This report includes cases of smallpox in both successfully vaccinated persons and those never having had a successful vaccination. Only one case history will be given in detail. This concerns the first admission and the only fatality.

CASE REPORTS

Case 1. A 23-year-old white man was admitted to this hospital 1 January 1953. He complained of the gradual onset, during the preceding four days, of headache, fever, chills, cough, sore throat, nausea, and vomiting. He had been given symptomatic therapy during this interval by his local dispensary. When his temperature rose and vomiting began, he was hospitalized.

On admission he appeared ill. His temperature was 102.4° F. His pharynx was deeply injected; his breath, foul; and his neck, supple. A roentgenogram of the chest revealed no abnormalities. The leukocyte count was 14,300 per cu. mm. The urinalysis findings were normal. The patient was treated empirically and given 180 mg. (300,000 units) of procaine penicillin twice daily.

The following morning he developed maculopapular lesions on the trunk. During the day, scattered lesions appeared on the face, scalp, and extremities. The patient's temperature was 104° F. A tentative diagnosis of smallpox was considered because: (1) the lesions did

From 21st Station Hospital, Pusan, Korea. Maj. Waldo is now assigned to U. S. Army Hospital, Fort Jay, N. Y.

not appear typical of chickenpox, (2) the patient denied that he had ever been vaccinated, (3) no vaccination scar could be found, and (4) he had "taken in" a little Korean beggar on 16 December because "he looked cold" and he had had the child sleep in the same room with him and "some buddies" for four days (this occurred the same day that the soldier arrived in Korea from Japan).

Procaine penicillin was increased to 600 mg. (1,000,000 units) three times daily. Due to the persistent vomiting, it was impossible to give antibiotics by mouth and fluids and vitamins had to be administered intravenously. The patient was placed in strict isolation.

During the next 48 hours all patients and duty and indigenous personnel were revaccinated regardless of the date of their last vaccination.

During the next three days the patient's temperature ranged between 102° and 104° F. The lesions became widespread over the entire body including the palms, soles, and oral mucous membrane. The vesicles were uniform, discrete, umbilicated, and from 0.5 to 1.0 cm. in diameter. The sputum was blood tinged and the patient complained of a sore throat. It was difficult for him to speak or swallow.

For the next three days the patient's condition remained essentially unchanged. The leukocyte count was 18,100 per cu. mm. with 53 percent lymphocytes.

During the following three days he stated that he felt somewhat more comfortable. However, edema of his face, neck, and fingers developed. His temperature ranged between 99° and 102° F. He was still unable to take food and fluids orally.

On the ninth day of the rash (fig. 1) the patient's temperature rose to 103° F. and he became more lethargic and drowsy. The following day he became more restless and mentally confused. He developed a crusting on the face, neck, and scalp. His leukocyte count was 4,050 per cu. mm. with 43 percent lymphocytes. Hemoglobin was 12.5 grams per 100 ml.

During the eleventh day of the rash the patient's general condition appeared to be more grave. He was given 20 mg. of corticotropin (ACTH) intramuscularly and another 20 mg. intravenously slowly over a three-hour period. Purulent mucus began to accumulate in his respiratory tree, and he died that evening, very suddenly, while the nurse was straightening his sheets. No autopsy was performed.

This soldier had apparently not been vaccinated against smallpox. He denied any immunizations prior to entrance into the Army 11 months before. No vaccination scar could be found on this man. Although his company immunization record indicated a vaccinia reaction on 22 July 1952, he denied repeatedly that he had ever had a vaccination

even after the procedure had been described to him in detail. He arrived in Japan in September 1952, and was sent to Korea 16 December 1952.

Figure 1 (case 1). Photograph taken on the ninth day of rash showing widespread umbilicated vesicles. Note the early crusting on the abdomen and the left forearm.

Case 2. A 21-year-old Negro was admitted to this hospital on 26 January 1953. Four days previously he had noticed the onset of sore throat, fever, and chills. Penicillin had been given for three days, and, on the fourth day, a rash appeared on the face, trunk, and extremities. He had been referred to the clinic with a diagnosis of possible infectious mononucleosis or penicillin reaction.

A tentative diagnosis of smallpox was made, and he was placed in strict isolation. Treatment included terramycin (brand of oxytetracycline) and penicillin to help combat secondary infection and scarring, codeine, and Dobell's gargles. By the following morning the macular and early vesicular rash had become generalized except for the palms and soles. Fluids and a soft diet were well tolerated.

On 29 January, the fifth day of the rash, the patient first developed lesions on the palms and soles.

A three-day period of mental confusion and disorientation was followed by beginning desquamation. Through even the most critical period, the patient continued to take sufficient food and fluids orally. At the time of transfer of the patient to Japan, the location of every smallpox vesicle could be seen as a lighter pigmented area of the skin but no definite scarring was noted.

The vaccination history on this soldier is significant. He had been in the Army nearly two years, yet it seems that he had not had a successful vaccination against smallpox. Vaccination prior to service entry was denied. No vaccination scar could be found. His official immunization record with his company showed the following: 4 June 1951, immune; 20 April 1952, no reading; 29 October 1952, immune. (The patient did not recall this last vaccination and claimed that he was on temporary duty in another area of Korea when the remainder of the company was vaccinated.) This soldier admitted having had close contact with Korean civilians.

Case 3. A 21-year-old Filipino soldier was admitted to this hospital on 17 February 1953. When brought to the hospital he had well-developed and widespread macular and vesicular lesions, and was acutely ill. Though a large vaccination scar was present, a diagnosis of smallpox was made. The patient was placed on terramycin and procaine penicillin therapy in addition to the symptomatic measures. The patient's course was stormy but after the first week he began to improve. Desquamation commenced on the fifteenth day and involved the hair, fingernails, and toenails.

This soldier was born in the Philippine Islands. He had received a successful vaccination in childhood. In March 1952 he was vaccinated, developed no reaction, and the results were not checked by a medical officer. He was sent to Korea in May 1952. In November, he was again vaccinated but insisted he got no reaction. (Official immunization record unobtainable.) He had close contact with Korean civilians.

Case 4. A 21-year-old Negro was admitted to this hospital on 15 March 1953 with a diagnosis of dermatitis medicamentosa. Five days prior to admission he had developed fever, coryza, and sore throat. He was treated with terramycin and because a rash developed he was sent to the hospital.

He appeared seriously ill and vesicular lesions were widespread, involving even the oral membrane, scalp, palms, and soles. A diagnosis of smallpox was made and strict isolation was instituted. He was given penicillin and terramycin. On the fourth hospital day, some of the facial lesions became pustular, and both nostrils became occluded by lesions. The following day his tongue was swollen; his face and ankles, edema-

tous; and his nose was swollen to twice its normal size. During the next three days many lesions became hemorrhagic, but the secondary infection slowly subsided.

Desquamation was complete on 26 May. There was mild alopecia but no loss of nails. Severe facial scarring resulted, particularly on the nose.

This patient was inducted into the Army in 1951. He was sent to Korea in January 1953. Vaccination prior to entry into the service was denied. Careful examination disclosed no vaccination scar. There was an entry on the patient's immunization register to the effect that he had been vaccinated against smallpox in January 1953. He categorically denied ever having been vaccinated. He admitted to having had close contact with Korean civilians.

Case 5. A 21-year-old youth was admitted to this hospital on 1 April 1953. Both the referring and admission diagnoses were influenza. Four days prior to admission he had experienced the sudden onset of sore throat, fever, prostration, and severe aching in his back and extremities. His temperature was 101° F. He had a circular area, an inch in diameter, containing numerous small erythematous macules, on the upper, outer aspects of the left arm. An old vaccination scar was present in the right deltoid area.

During the second hospital day, the patient became weak, lethargic, and vomited his evening meal. Two days later papular lesions appeared on the face, thorax, and other extremities. A presumptive diagnosis of chickenpox was made.

The patient was extremely ill with prostration, vomiting, and fever to 105° F. Lesions appeared on the palms, soles, scalp, and oral mucous membranes. By 6 April it became apparent that the correct diagnosis was smallpox. Umbilication of many vesicles was now evident. Procaine penicillin and terramycin were given to help combat secondary infection.

The subsequent course was uneventful; desquamation was completed by 21 May, and no residual scarring was apparent.

This soldier was a native of Puerto Rico, successfully vaccinated in childhood. He entered the Army in May 1952. In July 1952, he was vaccinated but denied any reaction. He arrived in Korea in January 1953. The patient stated that he was supposed to have been vaccinated against smallpox aboard ship but denied receiving the vaccination. A history of close contact with Korean civilians was readily obtained.

Case 6. A 26-year-old Swedish soldier was admitted to this hospital on 9 June 1953. Four days prior to admission he had developed coryza, fever, chills, headache, and sore throat. Encephalitis was suspected and he was admitted to another United Nations hospital in the area. The spinal fluid was essentially normal. A febrile course was con-

tinued, and on the day of interhospital transfer, erythematous macular lesions first appeared on the wrists and later became generalized.

Penicillin and terramycin were started. Some parenteral fluid was necessary during the first two days. The course of the disease was rather mild in spite of the fact that about 50 percent of the lesions became hemorrhagic. A few pustules appeared on the nose, forehead, and cheeks. Desquamation was complete on 15 July. The hair and nails were unaffected, and no permanent scarring was evident.

The patient was successfully vaccinated against smallpox at the age of eight years. When revaccinated in 1941, he denied a reaction. While still in Sweden he was vaccinated again on 16 April 1953, and this was read as "immune" the following day. On arrival in Korea on 24 April, he was stationed in a rear area. Two weeks prior to onset of the illness, he had visited a house of prostitution in which two persons with smallpox were discovered several days thereafter.

SYMPTOMS AND SIGNS

In these six patients, the prodromal symptoms were coryza, malaise, sore throat, and fever. Those present after admission included rash, lethargy, weakness, prostration, cough, and hemoptysis. Only two patients demonstrated mental confusion and were disorientated; both of these were without a history of successful vaccination. Aching of the back, mentioned in nearly all textbooks, was seen in only two patients. Anorexia and vomiting occurred in four patients. Three patients did not have headaches. The rash appeared first on the trunk in only one patient.

DIAGNOSIS

Frozen vesicular fluid and fixed skin scrapings from these patients were submitted to the 406th General Medical Laboratory for studies. Information supplied by that laboratory placed the infectious agent in the vaccinia variola group.

From a clinical standpoint, there was no doubt as to correctness of the diagnosis of smallpox in these patients. Diagnostic confirmation was obtained from both the Korean Public Health officers and more experienced United States Medical Corps members.

Many physicians have never seen a patient with smallpox, and, until having seen one, exhibit a low index of suspicion. It is interesting to note that, though four patients were admitted with the rash apparent, in only one patient was smallpox suspected. A referring diagnosis of smallpox was not made in five of these patients. In an area where smallpox is endemic, a strong suspicion of an occasional case must be present. Because the prodromal signs and symptoms are protean and common, frequent

inspection for early skin lesions and vaccination history are the essentials in making early diagnosis and in preventing others being exposed.

TREATMENT

Symptomatic treatment and good nursing care are still fundamental in this disease. Antibiotics are effective on secondary invaders. It is believed that secondary infection and resultant scarring is reduced by antibiotics given in sufficient quantities. The permanent scarring in one patient may have been the result of delayed hospitalization and antibiotic therapy. Only two patients complained of pruritus, and in one of these medication was necessary.

All patients complained of a severe sore throat. In spite of this, the maintenance of an adequate oral intake of food and fluid should be the cardinal aim of the physician. Frequent gargles cannot be too strongly recommended; they should be started early, at the first sign of sore throat, and continued on a definite schedule. The fever and prostration in the disease are severe. Alteration in body metabolism, cellular changes, fluid transudation, and tissue destruction are marked and can be likened to the changes produced by burns over a large area of the body. If adequate caloric intake is maintained the body has a good chance to respond. The patient who died lacked any oral caloric intake because of inability to swallow food.

VACCINATION

The value of smallpox vaccination has been demonstrated time and again. Though it can not offer absolute protection, a recent successful reaction is of great assurance. It is again the balance existing between virulence of the causative agent and the degree of immunity present that counts. The three patients who had received a successful vaccination in childhood had a less severe disease. None of the patients had a recent successful vaccination, and three had apparently never had a successful vaccination. It is interesting that the three patients having had childhood vaccinations were from Puerto Rico, the Philippine Islands, and Sweden.

American soldiers are presumably vaccinated on induction and again prior to being sent overseas. Errors in immunization can be entirely eliminated only if the physicians are charged with sufficient knowledge and interest. The physician should be certain of his own knowledge of interpretation of vaccination, the time interval between vaccination and interpretation, the correct entry in immunization registers, and the revaccination of any person without a definite reaction. Care must be taken

that "immune" is not recorded on patients who have had a "no take."

If every soldier could see a patient with smallpox, there would be no problem. The soldier would see to it that he was vaccinated, on time, and successfully. In reality, there are those who scheme to escape immunizations. A hospital patient who heard that a patient with smallpox had been admitted, requested permission to return to his company for a vaccination. He stated that he had never received any immunizations in the Army because he always had a buddy who "penciled in his shots." When the personnel in our own hospital unit were vaccinated, 50 percent had to be revaccinated because they failed to return for "readings." Intensive efforts must be maintained to continue to vaccinate each soldier until a definite reaction is observed. Obviously a "no reading" or "no reaction" is ineffective and unacceptable in preventing spread of smallpox. A vaccination, given correctly with a potent vaccine, read at proper time by trained personnel, and properly recorded, is the first line of defense against this disease.

SUMMARY

Six cases of smallpox occurred among United Nations personnel, four in American soldiers. Three of the patients apparently had never had a successful vaccination. The other three had been vaccinated in childhood but had not been vaccinated successfully recently. The disease in these last-mentioned patients, however, was less severe than in the other three. Although the majority of military personnel are properly immunized, constant vigilance, the detection of errors in vaccination and records, and continued intensive education of medical department personnel are necessary to eliminate the possibility of future outbreaks of smallpox.

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CONTINUOUS RENAL CLEARANCE STUDIES IN EPIDEMIC HEMORRHAGIC FEVER

JAMES C. SYNER, *Captain, MC, USA*
ROBERT A. MARKELS, *Captain, MC, USA*

SINCE early 1951, the Army Medical Corps has accumulated much information on epidemic hemorrhagic fever from its experiences in Korea. Documented and indexed, this data will serve as an excellent source for future reference, either directly related to the specific disease in the area, or indirectly as workers borrow from these experiences in handling problems of a similar nature arising in another geographic area. The investigative work on hemorrhagic fever produced new knowledge of abnormal renal physiology. In addition to its immediate application in treating patients with hemorrhagic fever, it has great potential in the approach to other diseases in which the kidney is involved.

The clinical features, laboratory findings, anatomic pathologic lesions, and epidemiologic data of hemorrhagic fever have been reported at great length.[1-10] The appearance of specific renal abnormalities, along with certain clinical manifestations during the course of the disease, are essential in order to classify a "suspect" diagnosis as "confirmed." For a diagnosis to be confirmed, evidence of renal abnormality must include albuminuria and an elevation of the blood urea nitrogen. Evidence of renal tubular insufficiency with diuresis of low specific gravity urine and diminished phenolsulfonphthalein output are always present in patients with confirmed diagnosis. The characteristic renal pathologic lesion as seen at autopsy, is considered to be near pathognomonic of the disease.[3] There is marked medullary congestion due to hemorrhagic diathesis. The cortex is pale and bulging, so that the corticomedullary junction is very distinct. The pyramids present areas of necrosis surrounded by hemorrhagic medullary tissue. Microscopically, the glomeruli do not present as much change as noted in the tubules. Tubules of the loops of Henle and collecting tubules are surrounded by dilated, engorged vascular spaces and extravasated blood. They show epithelial degeneration and casts of all types including pigmented casts.

The nature and variable degree of renal function abnormality in hemorrhagic fever has been noted in previous reports.[1-5, 10-12]

From Walter Reed Army Hospital, Washington, D. C. The studies were made at the 48th Surgical Hospital, Korea.

Froeb and McDowell[12] described their findings in rena hemodynamic abnormalities when using standard clearance technics. These investigators used renal clearance of inulin and para-aminohippurate as estimates of glomerular filtration rate and effective renal plasma flow respectively. The design of their study was basically a spot check, on a certain day of disease, consisting of three or four clearance periods of about 20 minutes each. In most patients spot checks were made from two to several days apart.

The study herein reported was undertaken in the fall of 1953, at a time when seasonal increase in case incidence was in progress. Its primary design was a continuous renal clearance study, with around-the-clock perfusion of para-aminohippurate, for estimation of renal blood flow changes during changes in the patient's clinical course. This primary design, as suggested by Earl and McDowell, was in contrast to the "spot-check" design of Froeb and McDowell's studies. It was reasoned that a continuous renal clearance study would provide information regarding characteristics of the disease process not demonstrated in previous investigations. In an attempt to determine this we did the following: (1) charted the time rate of fall in renal blood flow to determine if it was gradual or precipitous with hypotension; (2) charted the time rate of return of renal blood flow to normal to determine if it was gradual or precipitous; (3) correlated the time rate and degree of fall in renal blood flow with hypotension and shocklike state; (4) studied patients in the early febrile phase to learn if changes occurred in renal blood flow which might be missed by spot-check technic; and (5) correlated the changes in renal hemodynamics with clinical findings, blood pressure, total serum protein, hematocrit, urine volume, and urine specific gravity.

METHOD AND MATERIAL

In so far as possible, patients in the early febrile phase of the disease were selected for study. An attempt was made to include only those patients in the third to fourth day of illness as determined from the clinical history. Thirteen patients in whom about 136 individual clearance periods were made were studied.

A polyethylene catheter was introduced into the femoral vein through a 16-gage, thin-walled needle. This method permitted continuous, around-the-clock infusion without a single instance of tube occlusion or flow obstruction due to other causes. It eliminated the disadvantages inherent in prolonged arm vein infusion, namely, patient discomfort, bed confinement, and temporary disuse of an upper extremity for performing necessary chores. In some patients a continuous infusion was maintained over a period of four days without untoward reaction in the patient. With careful attention to urine flow, effective tunnel clamp adjustment, and

frequent blood sample analysis near constant levels of plasma para-aminohippurate were realized.

No standardized procedure was established for the time interval between clearance periods. The frequency of clearance periods was largely a function of the phase of the disease and the nature of the clinical course. With an unstable clinical course presenting varied and multiple changes, an increasing frequency of clearance periods was used. In general, however, we followed a program of daily clearance periods in the early morning, early afternoon, late afternoon, early evening, and late evening. This program provided data on renal hemodynamics every four to six hours over a given 24-hour period. Reported values for these periods are based on two or more clearance periods of from 20 to 30 minutes each. Five of the 13 patients studied during the acute phase were checked at some time during the convalescent or diuretic phases.

Glomerular filtration rate and effective renal plasma flow were measured by standard endogenous creatinine and para-aminohippurate clearance technics.[13,14] Our procedure was similar to that of Froeb and McDowell. A tunnel clamp, consisting of two tongue depressors and two screw clamps, gave adequate control of the infusion rate. After each urine collection the bladder was washed with 60 ml. of normal saline solution two or three times followed by 30 ml. of air. Because of the clinical problems of fluid control and restriction it was not possible to effect a water diuresis prior to each clearance.

RESULTS

Figures 1 and 2 present a summary of the renal hemodynamics in patients from the third through the tenth day of disease.

Figure 1 summarizes the data on continuous endogenous creatinine clearance in representative patients. The data illustrate the following characteristics:

1. In general, clearance of endogenous creatinine in most patients was not as markedly impaired as clearance of para-aminohippurate. This resulted in relatively high filtration fractions. A likely explanation for the creatinine data will be discussed later in this article.

2. In patients C. C., E. H., and C. C., extremely low clearance of endogenous creatinine corresponded with markedly reduced para-aminohippurate clearance. In these patients marked hypotension, a shocklike state, and oliguria were outstanding clinical features.

3. In patients R. S., R. T., and G. S., there was relatively slight change in clearance of endogenous creatinine although substantial drop in clearance of para-aminohippurate (fig. 2) was

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recorded. There was no significant change in blood pressure, urine flow, or hematocrit during this period in these patients (tables 1-4).

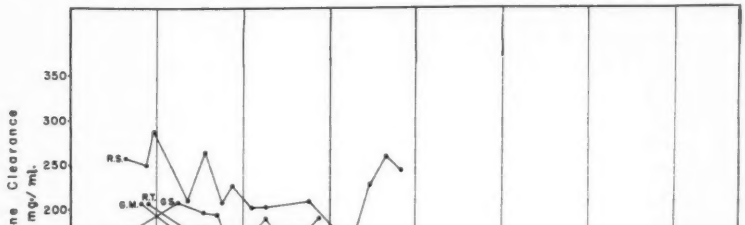

Figure 1. Data on continuous endogenous creatinine clearance studies in representative patients.

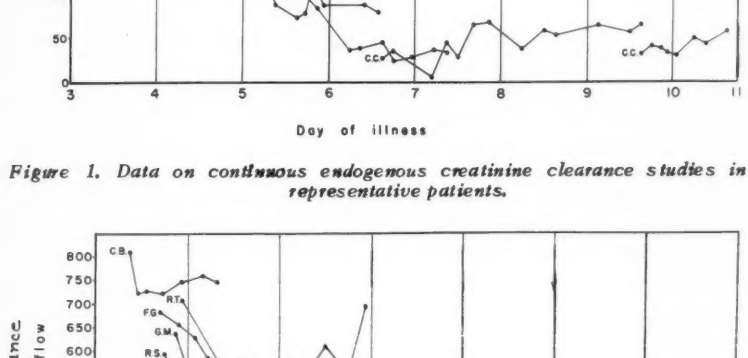

Figure 2. Data on continuous para-aminohippurate clearance studies in representative patients.

4. The time rate of fall in endogenous creatinine clearance was gradual and not precipitous despite wide fluctuations in blood pressure in some patients during this period (tables 1-4).

TABLE 1. *Renal function during febrile phase and in convalescent period of hemorrhagic fever*

Day of disease	Hour	Temperature	C-PAH (ml./min.)	C-Cr (ml./min.)	Filtration fraction	Urine (ml./min.)	Urine specific gravity	Urine albumin	Blood urea nitrogen (mg./100 ml.)	Hematocrit	Serum total protein (gm./100 ml.)	Blood pressure (mm. Hg)
2	1611	103[2]	705	300	.42	1.75	1.034	Neg.	16.5	52	6.7	140/76
	1800	103[2]	700	294	.42	1.25	1.107	Neg.		50		138/68
	2030	103[6]	670	300	.44	.99	1.020	Trace				140/80
	2300	104	620	292	.46	1.13		1+				140/80
3	0845	100[8]	334	241	.72	1.06	1.015	Trace	24.4	52	6.7	130/70
	1130	99[4]	300	310	.96	1.14		Trace				126/70
	1430	100[4]	270	220	.81	.92		1+				120/80
	1900	100	370	235	.63	.94	1.013	3+				140/70
	2030	99[6]	390	275	.70	2.1	1.012			50	6.6	140/80
4	0900	98[6]	450	244	.54	.78		1+	26.2			134/82
	1200	98[6]	410	236	.57	.68						
	2100	98[6]	410	250	.60	.73		1+				122/76
						Convalescent period						
9	1010	98[6]	798	192	.24	5.0	1.006	Neg.	12	44	6.6	136/74
	1030		750	170	.22	3.63	1.007	Neg.		44	6.6	
	1100		800	170	.21	3.63	1.007	Neg.				146/82

C-PAH, clearance of para-aminohippurate; C-Cr, clearance of creatinine, both in ml./min.

TABLE 2. *Renal function during hypotensive and oliguric phases and in convalescent period of hemorrhagic fever*

Day of disease	Hour	Temperature	C-PAH (ml./min.)	C-CR (ml./min.)	Filtration fraction	Urine (ml./min.)	Urine specific gravity	Urine albumin	Blood urea nitrogen (mg./100 ml.)	Hematocrit	Serum total protein (gm./100 ml.)	Blood pressure (mm. Hg)
4	1000	102[4]	336	154	.45	.775	1.017	1+	19.1	52	6.25	130/80
	1200	102	320	177	.59	.775	1.015	2+		53	6.3	
	1300		320	166	.52	.68	1.018	2+		53	6.3	124/80
	1700		320	171	.53	.75		3+		55	6.3	
	2200	101[8]	360	160	.57	.75		3+		55	6.25	120/80
5	0900	101	280			.70	1.014	3+	35.2	58	6.25	
	1300		220			.55		3+				104/60
	2000	100[6]	120			.46		3+		60	7.0	
	2300	99[8]	37			.29	1.015	3+		60	7.0	90/40
6	0900	98	17	22	1.20	.52	1.014	3+	59.7	57	7.0	105/50
	1100	98[6]	49	24	.49	.58		3+		57	7.0	
	1400	99	75	26	.52	.71	1.016	3+		55	7.0	90/50

TABLE 2. *Renal function during hypothensive and oliguric phases and in convalescent period of hemorrhagic fever*—Continued

Day of disease	Hour	Temperature	C-PAH (ml./min.)	C-CR (ml./min.)	Filtration fraction	Urine (ml./min.)	Urine specific gravity	Urine albumin	Blood urea nitrogen (mg./100 ml.)	Hematocrit	Serum total protein (gm./100 ml.)	Blood pressure (mm. Hg)
	1800	99	40	13	.32	.42		4+		52	7.0	
	2100	98[6]	36	13	.36	.42		3+		51	6.7	106/60
						Convalescent period						
23	1330	98	410	170	.41	4.31	1.004	Neg.	14	44	6.8	136/74
	1445		400	166	.41	3.68	1.001	Neg.				140/76
	1545		420	150	.36	2.2	1.006					
	1645		424	153	.36	2.92	1.005	Neg.				128/90

C-PAH, clearance of para-aminohippurate; C-Cr, clearance of creatinine, both in ml./min.

TABLE 3. *Renal function during the diuretic phase and in the convalescent period of hemorrhagic fever*

Day of disease	Hour	Temperature	C-PAH (ml./min.)	C-Cr (ml./min.)	Filtration fraction	Urine (ml./min.)	Urine specific gravity	Urine albumin	Blood urea nitrogen (mg./100 ml.)	Hematocrit	Serum total protein (gm./100 ml.)	Blood pressure (mm. Hg)
7	1400	98[6]	185	33	.18	2.5	1.000	Trace	150	44	8.4	142/88
	1500	98[6]	210	45	.21	3.38	1.001	Trace				145/90
	1630	99	210	44	.21	3.5	1.001	Trace				
	1930	99[2]	185	40	.21	2.91	1.002	Trace		44		144/100
	2100	99	145	50	.34	3.72	1.002	Trace		45	8.3	146/100
	2300	98[6]	148	51	.34	3.44	1.001	Trace				136/100
8	0900	98[6]	140	48	.34	3.37	1.001	Trace	135	46		
	1300	98[6]	140	56	.35	3.3	1.002	Trace				124/92
	2000	98[6]	150	58	.38	3.36	1.001	Trace				120/90
						Convalescent period						
20	1300	98[6]	640	205	.32	3.8	1.003	Neg.	16	41	6.6	120/76
	1400		630	185	.29	3.21	1.005	Neg.				122/78
	1500		645	179	.28	3.6	1.005					
	1600		615	179	.29	3.85	1.003				6.6	126/72

C-PAH, clearance of para-aminohippurate; C-Cr, clearance of creatinine, both in ml./min.

TABLE 4. *Renal function during the early convalescent phase of hemorrhagic fever*

Day of disease	Hour	Temperature	C-PAH (ml./min.)	C-Cr (ml./min.)	Filtration fraction	Urine (ml./min.)	Urine specific gravity	Urine albumin	Blood urea nitrogen (mg./100 ml.)	Hematocrit	Serum total protein (gm./100 ml.)	Blood pressure (mm. Hg)
25	0900	98[6]	510	170	.33	2.1	1.004	Neg.	26	44	6.6	136/74
	1300		510	166	.32	2.0	1.004	Neg.				
	1400		500	150	.30	2.3	1.001	Neg.				140/76
	1500		530	150	.28	1.88	1.002	Neg.				
	1600	98[6]	545	140	.25	1.76	1.004	Neg.				140/76
	1700		520	150	.28	2.01	1.004	Neg.				
	1800		524	153	.24	2.33	1.006	Neg.				140/92
	1900		530	153	.29	2.2	1.005	Neg.				
	2000		550	150	.27	2.3	1.003	Neg.				128/90
	2300	98	540	153	.28	2.9	1.004	Neg.				

C-PAH, clearance of para-aminohippurate; C-Cr, clearance of creatinine, both in ml./min.

5. Impairment of clearance of endogenous creatinine was present in some patients in the early febrile phase before hypotension, oliguria, and/or hemoconcentration appeared. This suggested early renal changes before more obvious and gross clinical changes were apparent.

The results of continuous para-aminohippurate clearance in representative patients are summarized in figure 2. The data illustrate the following characteristics:

1. The outstanding feature was the gradual and progressive diminution in this function, indicating failing effective renal blood flow. The curves clearly show that precipitous fall within hours is not the usual manner of functional change, but that over a 24- to 72-hour period maximum diminution results.

2. Significant diminution in clearance of para-aminohippurate may be present in the early febrile period at a time when blood pressure is stable, urine flow copious, specific gravity of urine indicative of adequate concentration, and hemoconcentration is absent (tables 1-4). At this time, however, evidence of diffuse vascular disease is apparent in pharyngeal, conjunctival, axillary, and thoracic petechiae, and ecchymoses at various body pressure points.

3. A correlation in the time rate and degree of fall in para-aminohippurate clearance with the clinical course of the disease was apparent.

4. The curves demonstrated maximum fall in clearance of para-aminohippurate occurs on the fourth day in patients with mild disease and on the fifth to sixth day in those with more severe disease. In a patient with clinically mild disease, such as in patients R. T., M. T., and R. S., the return of clearance toward normal was underway at a gradually progressive rate within 24 hours of the maximum fall. In patients with clinically severe disease, such as in patients C. C., E. H., C. C., and L. C., maximum diminution persisted during the study period of from 48 to 72 hours.

5. In all patients studied, excepting patient M. T., the return of para-aminohippurate clearance to normal did not occur within a 24-hour period from the time of maximum fall. In most patients there was a tendency to plateau at the point of maximum fall for 48 to 72 hours without significant change in the clearance function.

6. C. B. was a control patient with lobar pneumonia whose clearance of para-aminohippurate remained normal throughout the course of illness even in the presence of high fever.

THE FEBRILE PHASE

Table 1 summarizes data on renal function during the febrile phase of disease. The patient had characteristic clinical features of hemorrhagic fever with fever, nausea, vomiting, headache, marked erythema over the malar eminences and anterior chest, axillary and pharyngeal petechiae, a relative oliguria on the fourth day of disease, a mild, brief diuresis of low specific gravity urine from the eleventh to nineteenth day, and a maximum rise in the blood urea nitrogen to 30 mg. per 100 ml. on the seventh day. The significant changes in renal hemodynamics were as follows:

1. The effective renal plasma flow on admission as measured by para-aminohippurate clearance was within normal range.

2. The effective renal plasma flow began to fall during the second day of disease. At this time blood pressure was stable at normotensive levels, and the blood urea nitrogen, urine flow, and specific gravity were normal. The hematocrit, however, was slightly increased, indicating some degree of hemoconcentration (table 1).

3. The striking pattern in functional change was the slow, progressive manner in which the effective renal plasma flow diminished to abnormal levels during the febrile phase. At the time this fall in renal blood flow was taking place, the patient demonstrated evidence of severe widespread vascular involvement in the form of pharyngeal, conjunctival, axillary, and thoracic petechiae, and ecchymoses over body pressure points.

4. Follow-up studies revealed that the effective renal plasma flow had returned to normal limits by the ninth day of disease. At this time residuals of tubular damage were manifested by low specific gravity urine, inability to respond to pitressin stimulation, and abnormal urinary concentration test.

5. As measured by clearance of endogenous creatinine there were no significant changes in the glomerular filtration rate. The clearance of endogenous creatinine was considerably increased during the patient's febrile state as compared to the afebrile state. These high values when compared to the decreased clearance of para-aminohippurate resulted in high filtration fractions which returned to normal values during the convalescent period (table 1).

6. The data obtained during the convalescent phase indicated that renal hemodynamics had returned to normal limits.

HYPOTENSIVE AND OLIGURIC PHASES

Table 2 summarizes data on renal function during the hypotensive and oliguric phases with follow-up data obtained during the convalescent period on the twenty-third day of disease. The clinical course of this patient's disease was much more severe than that of the patient recorded in table 1. The clinical severity was attended by a more severe impairment in renal function as measured by laboratory technics (compare tables 1 and 2). The significant changes in renal hemodynamics were as follows:

1. Again, as noted in table 1, the striking pattern in functional change was the slow, progressive manner in which the effective renal plasma flow diminished to abnormal levels. This fall occurred independently of blood pressure status, and was well underway before maximum rise in blood urea nitrogen, hematocrit, and albuminuria had occurred (table 2).

2. In contrast, the fall in the glomerular filtration rate was much more directly related to the onset of hypotension, maximum rise in blood urea nitrogen, maximum rise in hematocrit, and oliguria.

3. The drop in urine volume was progressive rather than precipitous as recognized in a gradual fall from 0.70 ml. per minute to 0.29 ml. per minute throughout the fifth day of disease.

4. The increased severity of this patient's disease, as compared with the course in the patient recorded in table 1, is further noted in the failure of the effective renal plasma flow to attain normal levels by the twenty-third day of disease. However, it was markedly improved over the minimum noted on the sixth day of the disease.

DIURETIC PHASE

Table 3 summarizes renal function during a representative diuretic phase with follow-up data obtained during the convalescent period on the twentieth day of disease. The clinical course of this patient's disease had been moderately severe, although not as grave or stormy as that of the patient recorded in table 2. At the time of study he was secreting copious amounts of low specific gravity urine which reached a maximum flow of 6.5 liters on the eighth day of disease. The significant changes in renal hemodynamics were as follows:

1. The effective renal plasma flow remained at an abnormal low level (table 3) without significant change during the two days of continuous clearance study. Its value was independent of marked rise in urine volume and the presence of hypertensive blood pressure recordings. In the presence of extensive tubular

damage, the alteration of tubular epithelium could result in failure to extract para-aminohippurate from renal peritubular blood, thereby contributing to the low para-aminohippurate clearance.

2. The glomerular filtration rate also remained consistently low without significant change during the period of continuous clearance study. It was independent of the marked rise in urine volume (from 570 ml. on the fifth day of disease to 6,500 ml. on the eighth day of disease).

3. With a more proportionate diminution in clearance of para-aminohippurate and endogenous creatinine, there were normal and relatively consistent values for filtration fractions. This would suggest a phase of similar functional status for both glomerular and tubular sites although the glomeruli on autopsy specimens do not present nearly the abnormal changes noted in the tubules.[3,6,8] However, the shortcomings of the Jaffe reaction, used for creatinine determinations, throughout this study are important factors in interpreting the glomerular filtration rate as measured by the clearance of endogenous creatinine. This point will be discussed in more detail later in this article.

EARLY CONVALESCENT PERIOD

Table 4 summarizes data on renal function during a representative convalescent period. The clinical course of the disease of the patient represented had been moderately severe with a rather stormy course during the hypotensive and oliguric phases. He had a brisk diuretic phase with copious urine flow of nearly 5 liters over one 24-hour period. At the time of this study he was ambulatory, eating well, gaining weight, and complaining only of easy fatigability and mild lethargy. The significant findings in renal hemodynamics were as follows:

1. Low normal values for the effective renal plasma flow and the glomerular filtration rate were noted on the twenty-fifth day of disease.

2. Urine flow was at normal daily output of from 2 to 2.6 liters.

3. Evidence of tubular abnormality persisted in that his urine was of low specific gravity and it failed to respond to pitressin stimulation or to concentrate after withholding liquids.

4. Throughout the 24-hour period of continuous renal clearance study there was no significant change in the values obtained.

DISCUSSION

No serious attempt can be made to compare these data on filtration fractions and glomerular filtration rate with those of Froeb and McDowell because different methods were used. Froeb and McDowell used inulin as a measure of the glomerular filtration

rate. In using creatinine clearance as a measure of this rate an obstacle in the matter of specificity of function was introduced. That creatinine is not as specific a clearance substance as inulin for estimating glomerular filtration is well appreciated. Previous workers[15-17] have demonstrated that in man, and the higher anthropoid apes, clearances of creatinine definitely exceed clearances of inulin and of ferrocyanide. From their work it must be recognized that a certain proportion of creatinine found in the urine of man is the result of secretory activity of renal tubular epithelium.[18]

Another fact which adds difficulty to comparative study is the wide variation in creatinine clearance noted under normal conditions. At average rates of urine flow this variation may extend from 86 to 232 ml. per minute.[19-22]

Adding further to the differing values by the two methods is the nonspecificity of the Jaffe reaction, herein employed, for the detection of creatinine. Langley and Evans[23] and Miller and Dubos[24] demonstrated that of all the chromogenic material normally found in blood, all that in the serum and one half that in cells gave the color reactions of creatinine with alkaline picrate, whereas the concentration of true creatinine, as indicated by the enzymatic method of Miller and Dubos,[25] is about one half that of the Jaffe reaction.

Another reason for discrepancy in and limitation to comparative study is found in the work of Miller and Dubos.[25] These workers found that substances other than creatinine which gave the Jaffe reaction will accumulate in the plasma in nephritis. Therefore, data on the concentration of creatinine in the blood in renal disease must be accepted with reservation

From the data available, however, it is believed that the fall in the glomerular filtration rate was more closely correlated to defervescence, onset of hypotension, rising albuminuria, lowered specific gravity of urine, rising blood urea nitrogen, and hemoconcentration than was the fall in the effective renal plasma flow. The continuous renal clearance technic demonstrated in patients M. T., G. S., and L. C. (fig. 2) that the effective renal plasma flow may be diminished early in the febrile phase. Later in the febrile phase a slow, progressive diminution, underway for 24 to 48 hours, could result in a significant fall in the effective renal plasma flow before proteinuria, low fixed specific gravity of urine, hypotension, oliguria, hemoconcentration, or rising blood urea nitrogen appeared.

The conclusions drawn from this data agree with the suggestion of Froeb and McDowell, namely, that renal failure is secondary to alterations in renal vasculature. Because of the alterations in

vasculature, probably due to direct action of a toxin, progressive fall in renal blood flow occurs. The onset of this change begins early in the disease at a time when other equivalents of generalized vascular damage (marked erythema over malar eminences and the anterior part of the chest; crops of conjunctival, axillary, and pharyngeal petechiae; ecchymoses over areas of pressure on hips, shoulders, feet, and ankles; positive Rumpel-Leede test for capillary fragility; hematemesis) are present. The ultimate appearance of renal failure is most likely secondary to this alteration in renal vasculature. Then with critical reduction in renal blood flow and pressure from extravasated blood, tubular failure occurs secondary to anoxia of the epithelium. The data herein given tend to support this conclusion, rather than the concept that a toxic substance acts directly on the renal tubular epithelium.

SUMMARY

Continuous renal clearance studies in patients with a confirmed diagnosis of epidemic hemorrhagic fever as experienced in Korea revealed information not previously described. Continuous measurement of the clearance of para-aminohippurate demonstrated that diminution in effective renal plasma flow can occur early in the febrile phase of hemorrhagic fever before significant change in the clearance of endogenous creatinine. This was at a time when clinical findings of generalized vascular damage (diffuse petechiae, ecchymoses, hematemesis, positive Rumpel-Leede test) were present, but before evidence of renal failure appeared. There was a tendency for a critical fall in the clearance of endogenous creatinine to occur only in those patients in whom hypotension, a shocklike state, and marked oliguria were observed. In most patients the time of a critically low level of effective renal plasma flow was during defervescence of plasma leakage (rising hematocrit). A significant decrease in the clearance of para-aminohippurate or of endogenous creatinine may occur in the absence of hypotension or oliguria. Return of the clearance of para-aminohippurate and creatinine to normal occurs before tubular concentrating capacity. The data suggests that renal failure is secondary to renal vascular damage, and not a toxin acting directly on the renal tubular epithelium.

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KOREAN SURGERY

Eleven reports from the Surgical Research Team in Korea and the Army Medical Service Graduate School, Walter Reed Army Medical Center, Washington, D. C., appear in the March 1955 issue of the *Annals of Surgery.* These reports on battle casualties will be of interest to all medical officers.

THE CHALLENGING ART OF PSYCHOTHERAPY

Materials and Methods, and Uses of Hypnosis

JOHN E. NARDINI, *Commander (MC) USN*
WARREN L. JONES, *Lieutenant (MC) USNR*

PSYCHOTHERAPY is the treatment of mentally or emotionally ill patients by direct personal contact, primarily on a verbal level. All doctor-patient relationships contain a psychotherapeutic element. Only in recent years has a reasoned, studied approach been made to the problem. As with many modern psychiatric concepts, modern psychotherapy may also be considered to have had its inception in the work of Freud. As psychiatry evolved from the body of neurology, increased attention was centered on concepts of personality development, psychopathology, and psychotherapy. The greatest single impetus has been the introduction of psychoanalysis. In spite of many serious limitations, there has been a determined effort to evaluate therapeutic needs, technics, and results. From the classic analytic technic a wide variety of forms of treatment have been developed and used. These forms vary in manner, duration, and depth of treatment in direct relationship to the patient's needs. At present, one of the greatest handicaps in evaluating psychotherapy is the inability to measure results. Criteria of cure are most inexact, and it is difficult for the therapist to divorce his personal bias from his own evaluation of therapeutic benefit after having invested considerable emotion, time, and energy.

THE PLACE OF PSYCHOTHERAPY IN MEDICINE

It has been variously estimated that 50 percent of all patients who seek medical aid have no significant physical illness. A large proportion of these patients need some degree of psychotherapeutic assistance. In some cases only a superficial need is present, but in others the need is more extensive. Few patients are satisfied to be told that they have no diagnosable condition or that their complaints are imaginary. This very often throws them directly into the hands of charlatans. This produces poor results for the patient, wastes his money, and indirectly supports and encourages an ill-trained and relatively unethical group.

From U. S. Naval Hospital, Bethesda, Md.

Almost all physicians should have as much practical knowledge and skill of psychotherapy as possible. Psychotherapy is based on a dual relationship; hence, the role of the patient and the therapist should be considered separately.

THE PATIENT AND THERAPIST

One of the most significant features to consider is that psychotherapy cannot be forced. Complete collaborative effort is essential. Most patients do not know what psychotherapy entails and hence cannot be expected to say whether or not they desire it. Further, they should from the beginning wish to speak to the psychiatrist on their own initiative. It is only in rather few instances that psychotherapy can be helpful where the patients initially have and retain a hostile rejecting attitude. Qualities that make therapy possible are a desire on the part of the patient to be helped; a potential capacity for intellectual honesty (because the patient is destined during the therapeutic process to become consciously aware of some of the less desirable aspects of his nature); sufficient intelligence; and a willingness to make, or attempt to make, significant changes in his behavior and way of life.

Much could be said regarding the qualities of the therapist. The attributes which seem most important in the successful therapist are a genuine sympathetic interest in people and human nature, a great deal of patience, a reasonable knowledge of psychology and psychodynamics, a good grounding in general medicine so that he is capable of separating functional from organic complaints, considerable tolerance and freedom from bias (or an adequate awareness of his own prejudices, if any), and a considerable curiosity toward, and interest in advancing the understanding of, therapeutic problems. For treatment to be successful the therapist must be sufficiently sympathetic to his patient so that he will exert his best efforts, yet sufficiently detached so that he will not become overly involved emotionally with his patient. The therapist should be honest, sincere, and interested in the patient and his problems. The therapist's attitude may be natural or, if preferred for some reason, tailored to suit the needs of a particular patient or situation.

THE THERAPEUTIC SITUATION

Given a qualified therapist and a patient who desires treatment, the first step is the referral. In general, the referring physician should make it clear to the patient that he is unable to find any significant abnormal organic condition present and that sometimes emotional factors can produce these same symptoms; that for these reasons, and in the best interests of the patient, he would like the patient to talk to a psychiatrist who might be able

to offer some help in determining the nature of the condition and perhaps provide some treatment. It is far better that the patient refuse to see the psychiatrist at that point than to have him come to the interview so full of resentment, hostility, and rebellion that the psychiatrist's and the patient's time are equally wasted, and the patient subsequently prejudiced in his dealings with physicians in general.

Considerable time is now required for psychotherapy, extending from a matter of several interviews up to complete psychoanalysis of six hourly sessions per week over a period of three years. There is still considerable disagreement as to which patients require brief or prolonged treatment. In general, it can be compared to minor and major surgery. The patients who are least disturbed and have the least difficulties can often be benefited by only a few sessions. It is often difficult to say whether these same patients would have recovered spontaneously or whether they might have developed further serious psychiatric illness. Sometimes during these shorter therapies it is possible to recognize a significant and major issue, which when pointed out to the patient can be used by him to reorganize his thinking or approach.

In the therapeutic situation, and in all doctor-patient relationships, transference phenomena are important. By this, we mean that the patient unwittingly and unconsciously tends to project the same feelings toward the therapist that he had toward significant people (primarily parents) earlier in his life. Thus, if his feelings were positive and contained love for the parent, he would reflect the same toward the therapist. In the same manner, negative, hostile, or rebellious feelings would be reflected in some way toward the therapist. This helps to account many times for what appear to be irrational attitudes on the part of our patients, and unless considered in this light can provoke the physician into unwise rejection and hostility, or an equally unwise sense of his own greatness. In general, it can be said that the more frecuently treatment is given and the longer it continues, the more extensive the transference relationship becomes. In the analytic situation it is essential that this so-called transference neurosis be resolved.

At a fairly early stage in the treatment, it is essential for the therapist to carefully evaluate the patient's assets and liabilities on a fair and impartial basis. It is folly to expect that every patient will be able to achieve the same results. It is likewise folly to presume that treatment will often make a patient greatly better than he has ever been at his best before. At some point in the treatment it is desirable that the patient himself realistically recognize his basic assets as well as his liabilities.

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GOALS OF TREATMENT

On the surface, it would seem to be a simple matter to define the goal of treatment; however, it is one of the most evasive and difficult aspects of therapy. Confusion often stems from the fact that there are two sets of goals in mind; one the patient's and another the therapist's, each separately arrived at and differently determined. The other major difficulty is that patients experience great difficulty in establishing their own treatment goals. Many have no idea of what therapeutic goal to strive for, while others place the goal at an unrealistically high and unobtainable level. Treatment is best accomplished when the goals are realistically established and the therapist does not impose or force his own concepts on the patient. Goals may vary from the eradication of a symptom to a thorough reorientation toward life and a significant and extensive reorganization of attitudes and personality. Some patients establish as their goal the ability to alter their husband or wife, or to become so improved that they can incorporate in themselves all of the good and desirable characteristics that they observe in others. These are not reasonable goal concepts.

When considering the neurotic patient, it must be realized that his symptoms have probably served as a prop for many years. If the prop is to be successfully removed in the course of treatment it must simultaneously be replaced. Benefit or cure requires the patient to realize the irrationality of the neurotic mechanism and the underlying factors of insecurity and anxiety. He will further need to develop a more realistic tolerance and love of self and his fellow man. Hate is a luxury no man can long afford. Without self-respect, one cannot be happy and cannot love or respect others. Lack of self-respect makes for an ever-increasing isolation which must be broken if the patient is to be helped.

Psychosomatic disorders are little different psychotherapeutically from other conditions except that a useful guide to effective treatment exists in the exacerbation or abatement of symptoms. The conflicts and emotional disturbances are often deep-seated, and considerable therapeutic time and effort is required. Contrary to some opinion, it is believed that the same person is capable of a wide variety of psychosomatic complaints, which tends to belie the concept of specific emotional causative factors. Also, the same person is capable of producing different somatic symptoms in different areas at different times. Much work remains to be done in studying and correlating basic personality types, emotional complexes, and the resultant psychosomatic symptom pattern.

MISCELLANEOUS FACTORS

The general tenor of psychotherapy is reorganization of the patient's ego strengths so that he is a more co-operative, useful, and probably more conforming member of society, but with retention of his spontaneous creative capacities. The psychotherapist should not make the mistake of trying to treat a patient as though he lived in a vacuum, free of the constant social, cultural, political, moral, and religious influences that beset him on all sides and at all times. A patient subjected to an over-permissive form of treatment designed to rid him of restricting and paralyzing fears and guilt may have to pay too great a material and spiritual price if he does not remain within the bounds of normal social living. Rarely is it indicated, for example, that a psychiatrist should become personally involved pro or con in the matter of religious faith.

In the minds of those who first come into serious contact with psychiatry there is the belief that a given set of diagnostic psychodynamic principles and formulas exist, and that when these have been mastered and applied to a treatment situation the patient's troubles will promptly fall away. This is, unfortunately, not the case. The dynamic principles and theoretic formulations at hand offer considerable help in understanding the nature of psychopathologic processes in certain areas in certain patients, but it is virtually impossible for them to provide an adequate explanation for every complex-conflict symptom and its total interrelationship. One must avoid becoming so bogged down in trying to ferret out separate significant dynamic mechanisms that the over-all needs of the patient are missed.

Some basic concepts, however, are essential, such as a comprehension of security feelings. It is important to understand the different mechanisms that undermine security and the resultant symptoms that different persons may manifest when insecure. The patient is rarely ever able to state openly that he is insecure. It is, therefore, necessary that the therapist recognize insecurity by understanding its significant manifestations. It is important to understand that many forms of apparently foolish and useless behavior and ineffective, bizarre forms of thought represent in reality inadequate defenses against anxiety. Another common response which is true both individually and collectively is that of deprivation and persecution → frustration → aggression, which, if blocked → depression and apathy.

SUGGESTIONS FOR THERAPEUTIC APPROACH

The therapist must listen carefully and meaningfully. This involves constant thinking during the interview and an attempt at

correlating significant utterances with past experiences, reactions, and statements.

The patient should be allowed to "discover" and recognize significant relationships himself whenever possible. These discoveries are often most appreciated by the patient and most helpful to him in reorganizing his new approach to his problems.

Interpretations should be timed accurately. Any interpretation offered the patient regarding his psychologic pattern gains or loses in force with proper or improper timing. It is extremely difficult to teach this most significant process because it never occurs twice the same way.

Abreactive productions are usually of benefit and should be allowed when they seem to come forth freely and spontaneously. Patients usually do not produce more than they are able to digest, at least eventually.

It is advisable to instruct the patient to make no major life decisions during the course of extensive treatment.

It is difficult but necessary to recognize and handle the patient's resistances to treatment as they arise; otherwise the course of treatment may be slowed, or blocked to further progress.

While we are accustomed to thinking of our usual form of communication as verbal, there are many wholly nonspecific manifestations on the part of the therapist, consisting of facial expressions, gestures, change of position, tone of voice, and even occasional unintelligible grunts, which can just as effectively convey significant meaning to the patient. These should be used only in keeping with the therapist's ability to communicate in this fashion.

A frequently effective means of getting the patient to see the relationship of his symptoms to anxiety situations is to carry him back to the earliest possible episodes which were associated with the anxiety. With practice on the part of the therapist and the patient, this is often a rewarding device.

As soon as possible the therapist should attempt to determine or recognize the central core of the patient's problem, and to isolate the major and minor conflicts, so that he may best guide the course of therapy.

Playing God is likely to invite considerable subsequent dissatisfaction for both patient and physician. Direct advice is best avoided except at times in single interview sessions, and even then the patient should be advised that because he is the one involved and will be obliged to live with the decision, the final decision should be his own.

HYPNOSIS IN PSYCHOTHERAPY

In introducing a discussion of hypnosis and its application to psychiatric treatment, it is necessary to describe the characteristics of the condition. Despite the frequent demonstration of hypnosis, popular interest in the subject, and years of research, relatively little is known regarding the state described as hypnosis. Though numerous theories have been advanced, it seems best to regard hypnosis as an alteration of consciousness which may occur in varying degrees. Hypnosis has found general acceptance in the field of entertainment; understandably so because numerous unusual stage tricks have been devised making use of a small area in the total hypnotic spectrum.

Hypnosis as an effective medical technic has been accepted in varying degrees in the past. History reveals that prior to the introduction of chemical anesthesia hypnosis often was used for major operations. Hypnosis, both in the past and at present, has found application in various fields of medicine and surgery.

Psychiatry has been slow to absorb and make use of the possibilities of hypnosis. Probably one reason for this is that psychiatry is vague enough without adding another vagary. Also, the difficulty of inducing a workable stage of hypnosis has been a significant barrier. It is understood that one of the reasons Freud turned away from hypnosis was his difficulty with its production. Valuable phenomena may be brought out in the light or medium stages of hypnosis; however, only the deep somnambulistic stage permits the development of age regression, recall of repressed memories, complete amnesia, and disintegration of blocking resistances.

Psychotherapy as a process of treating mental illness is a cooperative enterprise. This demands the utmost of the patient's emotional and intellectual energies and taxes the psychotherapist to help without hindering the patient in his process of reintegration and progressive independence from the therapeutic setting. Even in the hands of the most capable therapists, this is often time consuming, prolonged, expensive, and at times uncomfortable. Recent experiences with hypnosis have indicated the possibility of its shortening treatment and augmenting the process to the advantage of both patient and therapist. Hypnosis is not a form of psychiatric treatment *per se*; its use is analogous to the use of anesthesia in surgery, permitting psychotherapy to be conducted under a kind of mental anesthesia. This agent permits a clearer view of many hidden, guarded areas of the mind and has the property of permitting psychic probing with greater safety for the integrity of the personality structure. A tenuous mental adjustment which could disintegrate into a state of psychotic

disease or a major panic reaction is given protection, for example, by the hypnotic induction of amnesia at the conscious level. Hypnotic applications in psychotherapy may be said to act as a buffer during intense emotional reactions incident to the processes of psychotherapy.

The hypnotic eradication of a psychogenic symptom is usually useless because the majority of these conversion or hysterical symptoms represent a mental compromise which, in effect, avoids even greater distress. Taking away the symptom without changing underlying structures of the mental makeup leaves the patient in a bad spot, giving him no alternative but to fill the hypnotically produced gap with some new compromise for relative comfort of his partially disabled ego. It has been found effective to use hypnosis, for example, in the management of an hysterical paralysis by assisting the patient under hypnosis to gain control of a paralyzed area, yet leaving him with a small remaining area of paralysis to which he can attach, on an unconscious level, the same dynamics that qualitatively produced his original, more generalized symptom. For example, an hysterically paralyzed arm could be converted into a residue of paralysis involving only the little finger, hypothetically leaving the patient with a degree of stop-gap mental compromise but with fairly adequate function of a member that may be instrumental in making his living.[1] When meddling with the processes of personality structure, particularly during times of neurotic exacerbation or prepsychotic dysfunction, we must be careful not to treat a symptom which is actually, figuratively speaking, the only remaining crutch for the ego which enables it to limp along on the side of reality.

From a technical standpoint it appears that hypnotic processes cannot be forced or produced against the patient's will. The deeper stages of hypnosis are invariably attained through the active participation of the patient. The patient by his own decision enters a state of altered consciousness, and while in this state participates in the incorporation of suggestions given by the hypnotherapist. It is the responsibility of the therapist to direct an accurate approach. This entails judgment in regard to the patient's capacity to accept and make use of suggestions. The timing of these suggestions is of extreme importance. A psychotherapist soon learns that during the course of psychotherapy the stakes are high; much may depend upon what would, under ordinary circumstances, appear to be a very minor or trivial matter. Words, suggestions, and interpretations made by a psychotherapist may be likened to the scalpel in surgery. Mistakes in their use, as in the use of the scalpel, can prove disastrous, severely crippling a patient who otherwise might have had a fairly optimistic prognosis. Reportedly, the use of hypnosis permits wider

exposure, revealing a more direct approach to the psychopathologic condition, limiting mistakes, and giving more control of the field of psychiatric treatment.[2]

One example of the safety factor in hypnotherapeutic technic is that of assisting the patient to project his pathologic mental content onto hypnotically fantasied secondary objects.[3] Later these projections of the patient are incorporated into the process of treatment. One such hypnotic technic is called "the theater technic." This method is occasionally used with patients who are suffering from acute anxiety symptoms of recent origin. A fairly deep level of hypnosis is inducted in the patient and he is instructed to fantasy himself a member of an audience in a theater. As he watches, it is suggested that a master of ceremonies will soon appear on the stage and will look behind the curtain. The patient is then informed that the master of ceremonies peers behind the stage curtain, then turns back to face the audience, and it is grossly evident that he is tense, anxious, shaky, worried, perspiring, and in apparent "nervous distress." It is suggested to the patient that whatever the master of ceremonies saw behind the curtain caused him to become quite upset. The patient is then told that the lights of the theater are dimming and as he watches the curtain will part and he will soon see what it was that produced so much anxiety in the master of ceremonies. In this manner the patient is put in the position of projecting from his own mind what is conceivable to him as a frightening set of circumstances. Without realizing it he will, as a rule, project what is uppermost and most significant to him at the time, revealing unconscious traumatic areas which may have been instrumental in producing his own anxiety reaction.

Other projection devices are being developed for the patient's recognition of conflicting circumstances, or other dynamic processes of emotional illness, and are used often in hypnoanalysis. Most generally these are procedures that the therapist and the patient both work on while the patient is at a deep hypnotic level. At a conscious level some revelations can be traumatic for the patient, threatening his personality structure to the extent of a major setback. Therefore, prior to awakening the patient, amnesias are produced or in other ways distortions are made that protect the patient from areas that are too powerful and could overwhelm him. At times the patient is called upon to help, while deeply hypnotized, with decisions regarding his conscious capacity to make use of and integrate the information that becomes available to him from his own deeper mental areas. As he improves during the course of treatment he may be desensitized and gradually brought to realize more fully the significance of areas within his own personality.

Another method for reaching distorted mental areas is the approach to trauma in early life by age regression of the patient. It is reported that numerous hypnoanalysts of reputable background are able to produce regression in their patients to the points of origin of mental maladjustments. Under regression the precipitating circumstances are altered and in effect ironed out. Often during the course of psychotherapy the patient may be blocked when approaching a significant emotional area. This area of resistance is usually resolved only by a time-consuming process of detouring and then getting back on the original course. Hypnosis permits the therapist and the patient to penetrate directly into the area of resistance, thus saving time and continuing directly to the objective by avoiding the many blind alleys encountered so often at the conscious level.

Psychotherapy is frequently used to assist the relatively normal person in his struggle to overcome the temporary effect of predominantly external pressures impinging on his ego. It is proposed by numerous investigators that hypnotic technics can be used to facilitate the patient's recovery to his former stage of normal personality integration. The physical and mental relaxation obtained during deep stages of hypnosis permits the patient to gain a new orientation, particularly if he is given control of his condition and encouraged to gain by his own efforts the relaxation and comfort secondary to his hypnotic experience. Ultimately the patient may become more independent and self-contained,[4] dealing with his problems as they arise and not seeking satisfactions from a dependency relationship with the physician which would hamper the termination of treatment.

Though there are numerous uses for hypnosis in psychotherapy it has also been found to be advantageous in the field of psychiatric research. A recent article points out the development under hypnosis of "experimental conflicts."[5] While the subject is in a deep state of hypnosis a "conflict" is introduced by the hypnotist. Emotional distress at the waking stage and amnesia for its cause are the objective and the condition to be studied. These persons are treated for the "induced neurosis" by somewhat contrasting psychotherapeutic methods. Observation and objective estimates by psychologic tests following these psychotherapeutic technics give a relative indication of the value of the method used.

The future of hypnosis in psychotherapy and in medicine, judging from reported success and research in university centers and large clinics, is expanding and becoming respectable by the application of objective critical research. Hypnosis in itself is an exciting tool which, in the process of uncovering the mysteries of the brain and its potentialities, would appear to have tremendous power, perhaps even beyond our present expectation. New

methods for understanding and channeling mental forces can perhaps be devised with hypnotic technics. The intrinsic capacities of the individual human being, his regenerative, defensive, and reparative psychic powers, not to speak of the possibilities of dormant mental energies, would appear to be closer to our purview than ever before.

SUMMARY

For psychotherapy to be successful, the patient must desire to be helped and the therapist must exercise equal amounts of skill, patience, and objectivity. An important factor in the success of psychotherapy is for the patient and therapist to agree on, and keep in view, a realistic and attainable goal of treatment.

If skillfully used, hypnosis, by shortening and simplifying treatment, is a valuable aid to successful psychotherapy. The deep stage of hypnosis permits the production of such valuable phenomena as the development of age regression, recall of repressed memories, complete amnesia, and disintegration of blocking resistances. These phenomena open to the therapist critical areas of the psyche which other methods might never reveal, and permit their exploration under a kind of psychic anesthesia. In addition, psychiatric research has indicated that hypnosis may have therapeutic potentials even beyond present expectations.

CONCLUSIONS

Psychotherapy is many things. It may be specific or nonspecific, directive or nondirective, active or passive, deep or superficial. It may include ventilation, authoritarian pronouncements, exhortations, persuasion, suggestive comments, hypnosis, or none of these. It may seek to reach emotional insight, but succeed no further than intellectual insight. In the final analysis, psychotherapy is an inexact, demanding, frustrating, and highly challenging practical art.

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A REVIEW OF SYSTEMIC BACITRACIN THERAPY

FRANK L. MELENEY, *M. D.*
BALBINA A. JOHNSON, *B. A.*

THE BACITRACIN now available is safe to use when administered intramuscularly or intravenously and is effective in controlling systemic infections. Because bacitracin was released by the Food and Drug Administration for use by physicians outside of hospitals, as well as for hospital use, and because the drug was accepted by the Council on Pharmacy and Chemistry and published in "New and Nonofficial Remedies"[1] for 1954, its anticipated wider use makes advisable an explanation and clarification of the precautions which should be taken in its administration.

Before penicillin had been used extensively, its use was not associated with untoward side effects. Now, however, appreciable numbers of patients have become sensitized to the drug and the reports of fatal or nearly fatal anaphylactic reactions are increasing. Soon after the discovery of penicillin many other antibiotics were found, but the clinical use of many was contraindicated because of marked toxicity. Gramicidin, tyrothricin, and streptothricin were the most favorable in this category, but their use was limited to local application. Streptomycin quickly replaced its more toxic predecessor, streptothricin, but streptomycin had its disturbing effect on the eighth cranial nerve. Aureomycin and terramycin (the chlor- and oxytetracyclines) likewise appeared at first to be nontoxic, but with wider use frequently demonstrated unpleasant and even serious sequelae.

The early observations on bacitracin produced in the Biochemical Laboratory of the College of Physicians and Surgeons in 1943-1945 seemed to indicate that it was an antibiotic which could be administered systemically to experimental animals safely without evidence of injury to any of the organs, tissues, or functions of the body.[2]

EXPERIENCE WITH SURFACE-GROWTH BACITRACIN

The earliest clinical experiences with surface-growth bacitracin indicated a low toxicity entirely compatible with safe

From College of Physicians and Surgeons, Columbia University, and Presbyterian Hospital, New York, N. Y.

systemic administration,[3] but later some of the deep-tank lots began to show untoward side effects. Such reactions were widely publicized. Warning reports were made subsequently and quoted in journals and textbooks, so that the idea that bacitracin was dangerous became fixed in the minds of many physicians who thought that it should not be used except as a last resort. The ideal antibiotic which can be used safely with no restrictions or precautions whatsoever has not yet been found.

The first commercially produced bacitracin, made by the surface-growth technic, was studied by Scudi and associates[4-6] in the Department of Pharmacology of the College of Physicians and Surgeons. These studies revealed that its toxicity was low, but it was observed that high doses of the antibiotic caused swelling of the terminal tubular epithelium of the kidneys. However, cautious administration of this commercial preparation to human beings in gradually increasing dosage, demonstrated that up to 40,000 or 50,000 units every six or eight hours could be safely given systemically and would cause only a transient albuminuria beginning on the third, fourth, or fifth day of administration and disappearing with continued treatment. This seemed to indicate that the kidneys adjusted themselves to whatever transient effect there might be on the tubular epithelium. Along with the albuminuria, a few hyaline casts, renal cells, and white blood cells would occasionally appear in the urine, but they disappeared as the albuminuria cleared.

Eighty-five patients were treated systemically with this commercially prepared bacitracin without any significant evidence of toxicity. These cases were used in a preliminary report made to the American Surgical Association in 1948.[3]

EXPERIENCE WITH DEEP-TANK BACITRACIN

During this period, however, other pharmaceutical houses undertook the manufacture of bacitracin, and one of them succeeded in preparing it in larger quantities by the deep-tank method. This material was distributed to a number of investigators throughout the country. Without taking the same preliminary precautions that were used with the early material, these observers started with the same dosage which had been found safe with the earlier preparation.

In three of the investigating units it was soon evident that this deep-tank material was more nephrotoxic than the surface-growth product, although no fatalities resulted from its use. It was found that evidences of renal irritation, including albuminuria, cylindruria, and cellular discharges, were present. In one of the units, under the direction of Zintel[7] and Michie,[8] studies were made of the renal clearance of this material and it was found that with a dosage of 50,000 units every six hours, there

was an appreciable diminution of glomerular and tubal filtration, as well as renal blood flow. There was wide variation in different persons but a definite average decrease in all of these functions. In another of the units, under the direction of Pulaski,[9] a lethargy was observed in the patients, which persisted for some time, and along with it a rise in retained nitrogen, as indicated by tests for serum urea nitrogen or nonprotein nitrogen. At the same time, there was frequently a fall in the filtration rate of phenolsulfonphthalein and a lowering of the specific gravity. In our own study unit a few patients presented these disturbing side effects. However, in two of the units, under the direction of Longacre[10] and Reisner,[11] and in the great majority of our own patients, toxic manifestations were not observed.

As soon as these observations were reported by the various units, it was deemed advisable by the investigators to stop further systemic administration of bacitracin until the cause of this toxicity could be determined and the limitation of safe dosage could be studied. The records of all of the patients who had been treated were carefully analyzed with respect to clinical and laboratory evidence of toxicity and to the lot number of the bacitracin which had been used. A large series of animals was also treated with different lots to determine if they differed in toxicity. When all of the laboratory and clinical data were assembled, it was obvious that the bacitracin produced by surface growth was definitely less toxic than the material produced in deep tanks. Although the reason for that was not clear at the time, recent studies by Codington[12] have suggested the probable explanation.

TOXICITY SPECIFICATIONS

Specifications for the upper limit of toxicity which was considered safe by the Food and Drug Administration had been set at an LD_{50} of 200 units for a 20-gram mouse, on the basis of the surface-growth product. It was found that the Food and Drug Administration tests for toxicity on the deep-tank material could be correlated with the laboratory and clinical data. It was then clear that, apparently by mere chance, Pulaski's group and Zintel's group had made their observations with relatively toxic lots, while Longacre and his group and Reisner had worked with lots of insignificant toxicity.

In view of the clinical results and the analysis of the data, it was agreed that further systemic use of bacitracin in all of the units should be limited to material which could meet the specification of an LD_{50} of 500 units for a 20-gram mouse. Furthermore, the upper limit of 24-hour dosage was set at 100,000 units. It was soon found that higher dosage was unnecessary, because even in very severe infections, satisfactory clinical

results could usually be obtained with a dose of from 15,000 to 20,000 units every six or eight hours.

All of these clinical experiences were reported in 1949 with a review of the first 270 cases,[13,14] covering three periods of treatment, namely:

1. The period when patients were treated with the surface-growth bacitracin and evidences of toxicity were minimal and inconsequential.

2. The period when patients were treated with the early deep-tank bacitracin and evidences of nephrotoxicity were disturbing with certain lots.

3. The period when patients were treated with bacitracin in lower dosage, meeting the Food and Drug Administration toxicity specification of an LD_{50} of 500 units for a 20-gram mouse, and evidences of toxicity were minimal. (During the last period the confidence of the investigators in the efficacy and safety of bacitracin was largely restored.)

REVIEW OF CASES REPORTED IN 1952

In 1952 another series of 160 patients treated systemically with bacitracin was reported[15] and further confirmed the safety and efficacy of this form of treatment. The particular virtues of bacitracin for the treatment and prevention of neurosurgical infections, by local as well as systemic administration, were clearly demonstrated. This series did not represent the average patient with infections and systemic manifestations because many of them had received indiscriminate antibiotic therapy without preliminary bacteriologic studies. About 60 percent of the patients had failed to respond to the treatment first used and many were referred to us when all other treatment had failed and when all hope was gone. Although a number of these patients were practically moribund when bacitracin therapy was started they are included in the condensed tabulation of results in this series of patients (table 1).

Patients treated in the first four days of the infection had a higher percentage of prompt recoveries than those who had been ill for a longer time. Only four patients (2 percent) gave evidence of nephrotoxicity, and in these the intake of fluid was not up to the specified requirements of 2,500 ml. in 24 hours for an adult and a corresponding quantity for a child.

Included in this series was a patient with recurrent erysipelas for which she had received 13 different series of bacitracin injections. Each attack came promptly under control. The patient showed no signs of nephrotoxicity and no evidence of allergy to bacitracin. Since that time, the number of her recurrent attacks in-

creased to 42. She responded to bacitracin after each attack and there was no allergic reaction. Another patient in this series was given 20,000 units of bacitracin intramuscularly two or three times a day over a period of 10 months with a total of 10,000,000 units, without any evidence of residual kidney irritation or damage. Another patient took 10,000 units every eight hours for 50 days and 20,000 units every eight hours for 83 additional days with no allergic manifestations.

TABLE 1. *Results of bacitracin therapy*

Bacitracin therapy in patients	Total number of patients	Results of treatment				
		Excellent	Good	Favorable (percent)	Questionable	No effect
Without infection (prophylactic use)	29	-	20	69	6	3
With infections	131	41	63	79	20	7
Previously treated with other antibiotics without success	97	21	52	75	17	7
Not previously treated*	34	20	11	91	3	0
Total	160	41	83	77	26	10

*Note the significantly higher percentage of favorable results in the patients not previously treated, especially the greater proportion of the "excellent" over the "good" results.

As a result of this series of experiences the number of laboratory tests on patients being treated with bacitracin could be reduced considerably. The daily check on kidney function was found to be unnecessary, provided the prescribed intake of fluid was maintained and urinary output was about 1,000 ml. daily. Albuminuria could be expected to appear generally on the third or fourth day, reaching a low peak on the fifth to the seventh day and then subsiding. It invariably disappeared as soon as or soon after bacitracin was discontinued. (In fact, many of the patients in the earlier series, who had shown albuminuria, were brought back at that time and were found to have normal urine.) Side effects were minimal. Some patients had a loss of appetite and a few had nausea and vomiting, but this was readily eliminated by administering 25 mg. of dramamine (brand of dimenhydrinate) by mouth at the time of each intramuscular injection of bacitracin.

In the meantime the producers of bacitracin continued to increase its purity, resulting in lower toxicity of their product.

In January 1952, the Food and Drug Administration found that the assay specification could be increased from 35 to 50 units per mg. Instead of the LD_{50} test for toxicity (which was not always consistent, due to different strains of mice used), a "safety" test was proposed, namely, an LD_0 of 100 units for a 20-gram mouse.

CLINICAL RESULTS STUDIED

We were then asked by the Food and Drug Administration to carry out a carefully documented therapeutic series with hospital patients to see if these new specifications provided an adequate safeguard to permit the release of bacitracin for general use by physicians without the limitation "for hospital use only," previously required. It was decided to include in this series five patients treated with each of 12 different lots of bacitracin, four lots being provided by each of the three producers, for a total of 60 patients. This study[16] was reported in 1953 and convinced the Food and Drug Administration officials that systemic bacitracin is safe.

These clinical results were confirmed at the same time by a laboratory study on the toxicity of bacitracin in rats. This study was carried out simultaneously in the Food and Drug Administration laboratories, in the laboratories of each of the three manufacturers of bacitracin, and in the Surgical Bacteriology Laboratory at Columbia University. Doses were given approximating the maximum doses used clinically and repeated in amounts five times and 10 times that dose. The results were essentially the same in all five laboratories. With the dose corresponding to that generally administered in treatment, no significant kidney changes were produced. With the fivefold and tenfold dosage, there was microscopic evidence of injury, but it was obvious that the pathologic changes were reversible and reparable.

Benemid (brand of probenecid) was used in the only death reported and attributed to bacitracin in a desperately sick endocarditis patient who had failed to respond to other measures.[17] In the management of this patient the precautions recommended in the instructions (given below) were not observed, and although there was an alarming decrease in urinary output on the third day of therapy, bacitracin was continued for three more days, during which time the excretion of the retained drug was prevented by the benemid blockage in the kidneys. The action of the benemid undoubtedly increased enormously the concentration of the bacitracin in contact with the kidney epithelium.

EXPLANATION FOR DIFFERENCE IN TOXICITY

Recently Codington brought forward an explanation for the difference in toxicity of different lots of bacitracin. Craig and

associates[18] showed by countercurrent studies that commercial bacitracin is composed of five different polypeptides, which he designated bacitracins A, B, D, E, and F. Codington by similar countercurrent studies found that bacitracin F is the degradation product of the most active component, bacitracin A, and has essentially no antibiotic potency. Its toxicity on a weight basis, however, remains the same. These results indicate the possibility that the particular structure within the molecule responsible for its antibiotic activity is not itself responsible for the nephrotoxic property of bacitracin A. It is our hope that the particular structural grouping responsible for the remarkable antibiotic properties of bacitracin will be synthesized or by a suitable means split from the molecule and thus be made available for use. It is clear that commercial bacitracins which contain more A and less F are less toxic for a given number of units than those which contain more F and less A. If the degradation of A to F can be prevented in the manufacturing process, the assay will be higher and the toxicity less. The manufacturers are attempting to bring this about. In any event, the bacitracin now available with an assay of 50 or more units per mg. is satisfactory and safe.

INSTRUCTIONS FOR SYSTEMIC ADMINISTRATION

Extensive experience with the systemic administration of bacitracin has given satisfactory assurance that this antibiotic can be given systemically with safety by general practitioners outside of hospitals, provided that the following instructions are observed:

1. Dosage. If the causative organism is susceptible to bacitracin, doses of from 10,000 to 20,000 units (for an adult) given intramuscularly every eight hours will usually be effective in bringing the infection under control. (For a child, the dose should be about 200 units per kilogram of body weight.) If there is no response in 48 hours, the dose may be increased to 20,000 or 25,000 units every eight or every six hours for an adult (with a corresponding increase for a child). *The daily (adult) dose should never exceed 100,000 units a day. A single dose should never exceed 25,000 units.*

2. Administration. The concentration of the antibiotic should not exceed 10,000 units per ml. For intramuscular injection it should be dissolved in 1½ percent monocaine hydrochloride (brand of butethamine), in 3.8 percent unacaine hydrochloride (2-isobutylaminoethyl-*m*-aminobenzoate) per ml., or in 2 percent novocain (brand of procaine hydrochloride) in saline. It should be given in the upper outer quadrant of the buttock, alternating right and left and being sure to avoid giving two injections in the same spot. Pain at the site of injection is usually somewhat

more severe than when penicillin or streptomycin is injected. Bacitracin may usually be discontinued three days after the temperature has reached normal.

3. **Fluid Intake and Output.** *Fluids should be forced to 2,500 ml. or more a day in adults, with corresponding amounts for children. Intake and urinary output should be measured accurately every day. This is the most important feature of careful administration.* If the bacitracin is diluted by that amount of fluid intake, there need be little fear of toxicity. The daily urinary output should be around 1,000 ml. If it falls below 600 ml. a day, with a fluid intake of 2,500 ml., it would be wise to discontinue the bacitracin except in desperate circumstances. (In desperately ill patients bacitracin may be given intravenously in doses of 20,000 units in a liter of 5 percent dextrose in water or saline, administered slowly over a four-hour period.)

4. **Laboratory Controls.** To establish a base line, the urine should be examined before beginning bacitracin treatment. It should be re-examined every third or fourth day thereafter for the presence of albumin, casts, and cellular elements. These may be expected to appear on the second or third day of treatment and to reach a low peak on the fifth to the seventh day and then to decline with continued treatment. If no serious signs or symptoms appear in the first week, treatment may be continued practically indefinitely without fear of toxicity.

The blood urea nitrogen often shows some variability during treatment, but the test is not essential unless there is an oliguria.

5. **Other Side Effects.** Loss of appetite may occur and in some patients this may go on to nausea or vomiting. However, this may often be controlled by the administration of dramamine or 25 mg. of thorazine hydrochloride (brand of chlorpromazine hydrochloride) before each dose of bacitracin. Nausea and vomiting do not constitute a cause for discontinuing the drug, unless they interfere with nutrition or fluid intake.

SUMMARY AND CONCLUSIONS

Bacitracin is now safe for systemic use. It is a potent agent against all of the severe coccal and clostridial infections, many of which have become resistant to penicillin and the tetracyclines. Many persons have become allergic to penicillin and to a lesser degree to the tetracyclines, but primary hypersensitivity reactions to bacitracin are rare and allergic manifestations are practically nil. Bacitracin is bactericidal and not simply bacteriostatic, and therefore is of particular value in infections connected with surgical procedures. If bacitracin is used as a prophylactic agent or is used in the first four days in the course of an infection due to an organism which is susceptible to it

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(as indicated by an overnight laboratory test), the response will be prompt and favorable in a very high percentage of cases.

Bacitracin for systemic use should be available to all physicians for possible use in patients with infections caused by susceptible organisms. It should not be used simply as a last resort after everything else has failed. The instructions, as outlined, should be closely followed. Fluid intake and urinary output should be measured daily while systemic bacitracin is being administered. Benemid (probenecid) should never be used in conjunction with bacitracin.

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CONGENITAL ANOMALIES OF THE ESOPHAGUS

FRANCIS S. GERBASI, *Lieutenant Commander (MC) USNR*

A GENERAL knowledge of congenital defects of the esophagus is essential, especially for the general physician, the pediatrician, and the surgeon. Familiarity with the diagnosis and treatment of these anomalies would result in earlier operations and the survival of many more infants.

Much of the interest in this subject has been stimulated by Haight and Towsley,[1,2] who have pioneered many of the surgical developments in these conditions.

A workable classification of congenital anomalies of the esophagus, adapted from Feldman,[3] Palmer,[4] and Potts[5] and illustrated in figures 1 through 10, includes absence or atresia of the esophagus without fistula; atresia of the esophagus with tracheoesophageal fistula; fistula without other abnormalities; such congenital conditions as stenosis, shortness, and web of the esophagus; duplications of the esophagus; and neurogenic abnormalities such as chalasia and achalasia.

Except for absence of the entire esophagus and congenital web of the esophagus, which are exceedingly rare conditions and of no practical significance, these anomalies will be briefly discussed individually.

ATRESIA OF THE ESOPHAGUS WITHOUT FISTULA

Atresia of the esophagus is relatively infrequent when compared with the number of cases of atresia with fistula that are observed. In this condition both segments of the esophagus end blindly (fig. 2). There is no sexual predilection in this anomaly. From birth these infants cough, choke, and become temporarily cyanotic whenever they are fed or attempt to swallow because the material has no place to go other than to be aspirated into the trachea. Therefore, aspiration pneumonitis is a frequent occurrence. The presence of other congenital anomalies along with this condition is not unusual. Roentgenograms of the chest will often show an area of pneumonitis or atelectasis, while those of the abdomen reveal no gas in the bowel. The absence of air in

From the University of Michigan Medical School, Ann Arbor, Mich. Lt. Comdr. Gerbasi is now assigned to U. S. Naval Hospital, Corona, Calif.

the gut is very suggestive that no fistula exists, but does not absolutely prove the absence of such a communication. One must be aware of the fact that a few bubbles of gas in the colon could have been placed there by the insertion of a rectal tube or the giving of an enema. The diagnosis can be further confirmed by passing a small catheter into the esophagus until it meets an obstruction. Then about 1 ml. of lipiodol (not barium) is introduced, which outlines the upper segment of the esophagus well. Precautions must be taken that the child does not aspirate the oil into the lungs, for this may lead to the erroneous diagnosis of a tracheoesophageal fistula.

The earlier the diagnosis is made and the earlier surgical treatment is instituted, the better the prognosis. Primary anastomosis of the two blind pouches is seldom possible because the distance between the two segments is too great and the majority of infants will not be in good enough condition to tolerate such a long major procedure. These children's lives can be saved by a gastrostomy and a cervical esophagostomy. When the child is four or five years of age, an intrathoracic esophagus constructed of jejunum, or the transplantation of the stomach intrathoracically with anastomosis to the upper end of the esophagus can be considered.

If the child's condition is good when first examined, the stomach may be mobilized into the right side of chest. A primary anastomosis is then made between the esophageal segments. There are a number of advantages and disadvantages to this procedure and one must be cognizant of these before undertaking the operation.

ATRESIA WITH TRACHEOESOPHAGEAL FISTULA

Atresia of the esophagus with tracheoesophageal fistula is the most common congenital anomaly of the esophagus. The anatomic variations are shown in figure 3, the most common combination being that depicted in figure 3B. The diagnosis is not difficult. The accumulation of unusual amounts of mucus in the pharynx producing signs of respiratory obstruction should make one suspicious. Furthermore, the regurgitation of formula, attacks of choking, dyspnea, and cyanosis while feeding are characteristic. The inability to pass a catheter into the stomach confirms the diagnosis of esophageal obstruction, but roentgenograms are necessary to determine the exact nature of the anomaly. Pulmonary atelectasis or aspiration pneumonitis, particularly of the right upper lobe, is frequently seen. The presence of extra-esophageal congenital defects is not unusual. The introduction of 1 ml. of lipiodol through the catheter will demonstrate the type of anomaly present. The presence of air in the gastrointestinal tract of infants with this condition indicates a fistulous connection between the trachea or bronchus and the lower esophagus.

These patients cannot survive without surgical correction. The operation consists of either an extrapleural or transpleural approach to the anomalous structures through a right parascapular incision. The tracheoesophageal fistula is closed and an end-to-end anastomosis of the two esophageal segments is performed. About two thirds of the patients will survive operation. Some of these infants will develop a small stricture at the site of anastomosis which usually will respond to dilatations.

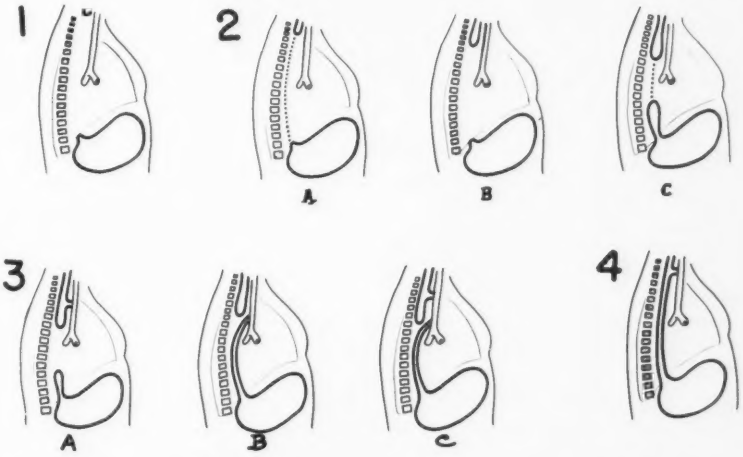

Figure 1. Absence of the entire esophagus. Figure 2. Atresia of the esophagus without fistula. (A) Atresia of the entire organ with a residual fibrous cord connecting the hypopharynx and the stomach. (B) Small cul-de-sac representing the cervical esophagus, without further evidence of the organ. (C) The proximal and distal segments end as blind pouches which are joined by a fibrous cord. Figure 3. Atresia of the esophagus with tracheoesophageal fistula. (A) The fistula communicates with the proximal pouch; the lower end is blind. (B) The fistula communicates with the distal pouch; the upper end is blind. (C) Both ends of the esophagus are connected with the trachea. Figure 4. Fistula without other esophageal abnormalities.

CONGENITAL TRACHEOESOPHAGEAL FISTULA WITHOUT ATRESIA

Congenital tracheoesophageal fistula without atresia occurs infrequently, and has been seen only five times at this hospital. An important fact which has previously received no comment in the literature is that the majority of these tracheoesophageal fistulas occur 2 cm. or higher above the bifurcation. This is in contrast to tracheoesophageal fistulas associated with atresia, for most of these are within 2 cm. of the coryna. About one third of the fistulas occurring without atresia are near the level of the jugular notch or above (fig. 4). This is most important,

for those at or above the second dorsal vertebra should be approached through a cervical incision and not through the chest. The signs and symptoms vary, depending largely on the size of the fistula. A large fistula produces symptoms similar to those observed in congenital atresia with fistula. If the fistula is small, the child may maintain a good nutritional status and will cough only when taking fluids or when placed in the prone position. Such a child is often hospitalized many times for recurrent bouts of pneumonitis. Roentgen examinations are essential to establish the diagnosis and to determine the exact level of the fistula. The treatment, of course, is division of the fistula and closure of the divided ends. A cervical incision is used for a fistula at or above the level of the second thoracic intervertebral space. A right thoracotomy is the approach for lesions below this level.

CONGENITAL STENOSIS

In our small series the majority of cases of congenital stenosis of the esophagus occurred in male children. The onset of symptoms varied, but about 60 percent of the patients showed evidence of obstruction before the age of 15 days. This is in contrast to the experience of Holinger and associates[6] who had noted symptoms to appear for the first time after the age of five months. Most of these children are not seen in the hospital until they are three years of age or older. They prefer fluids to solids because the latter make them vomit. They eat slowly and masticate their food well. Vomiting of undigested food is usually effortless and not projectile. An esophogram confirms the diagnosis. The stenotic area will be seen near the junction of the middle and lower third of the esophagus (fig. 5). A small hiatus hernia frequently observed with this lesion is believed to be acquired, not due to an associated congenitally short esophagus as suggested by Kelly.[7] Esophagoscopy is essential, for this will determine the exact nature of the stenotic area and the degree of esophagitis present. The treatment should consist of five or six dilatations if roentgenograms and esophagoscopy indicate that the stenotic area might yield to such therapy. If the stenosis recurs after such therapy, the lesion should be excised and the esophagus reapproximated by an end-to-end anastomosis.

CONGENITALLY SHORT ESOPHAGUS

The congenitally short esophagus is exceedingly rare, and is seldom troublesome in those infants and children in whom it is present. Most of the cases which are called a congenitally short esophagus are acquired. When symptoms do occur they result from such complications as peptic ulceration, esophagitis, and stricture formation; therefore, the symptoms may be vomiting, dyspnea, retrosternal pain, hematemesis, and melena. A roentgenogram after barium will demonstrate the esophagus to be short, and the stom-

ach will often appear pyramidal in shape (fig. 6). There is no agreement as to the treatment in this condition. Simple procedures such as a bland diet, dilatations, or a phrenemphraxis should be tried first. If these are not successful, the extensive operative procedure of mobilizing practically the entire esophagus so that the stomach may be replaced in the abdomen should be done.[8] It should be recognized that if no treatment is instituted, most of these patients will develop the complications already mentioned.

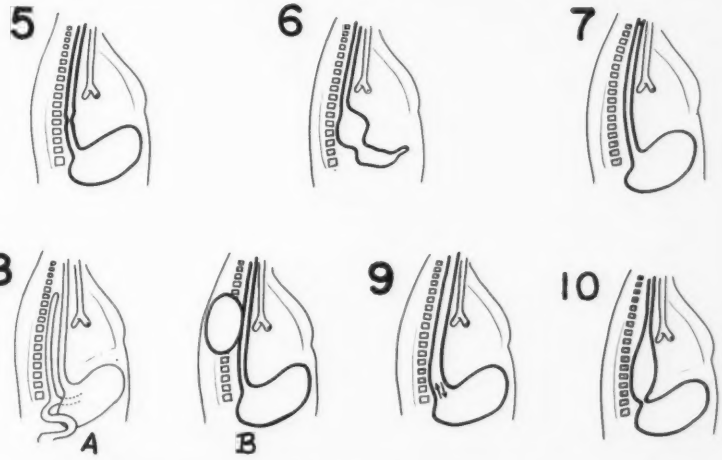

Figure 5. Congenital stenosis of the esophagus. Figure 6. Congenitally short esophagus. Figure 7. Congenital web of the esophagus. Figure 8. Duplications of esophagus. (A) Duplication of intestinal origin. (B) Cyst of the esophagus. Figure 9. Chalasia. Relaxation of the cardio-esophageal junction so fluid may readily pass in either direction. Figure 10. Achalasia. Sharp, pointed narrowing at the esophagogastric junction with dilatation above it.

DUPLICATION OF THE ESOPHAGUS

Most duplications of the esophagus are cystic structures and are either intramural or extramural (fig. 8B), the latter being more common. Rarely, one finds that the duplication is of intestinal origin (fig. 8A). The cyst is extrapleural; infrequently, its lumen communicates with the lumen of the esophagus. The symptoms are variable but are usually of a respiratory nature such as dyspnea, cyanosis, or coughing. The patient may also have dysphagia, vomiting, and pain in the chest. The cysts may produce no symptoms at all. The majority of these cysts protrude into the right hemithorax and occupy the superior portion of the posterior mediastinum. Roentgenologically these duplications not only produce a round homogeneous shadow posteriorly but are frequently associated with congenital malformations of the spine, especially

scoliosis and hemivertebra. The treatment of these lesions is transpleural excision.

CHALASIA

Chalasia refers to persistent relaxation at the cardio-esophageal junction,[9] and is of equal frequency in males and females. Vomiting, the main symptom, occurs about 10 days after birth and will become progressively worse if untreated. The child is found to regurgitate most often when he is placed on his back. Dehydration and aspiration pneumonitis are frequent sequelae. Roentgen studies are essential to establish the diagnosis. The barium is seen to go up from the stomach into the esophagus on inspiration when pressure is applied to the abdomen. On expiration the barium may come up into the mouth, go back into the stomach, or both (fig. 9). Treatment consists of keeping the child in the upright position for 30 minutes or so after eating. If symptoms are severe, he may have to be kept upright day and night. Usually in three or four weeks the condition corrects itself.

ACHALASIA

The sex incidence of this condition and the question of its origin, whether congenital or acquired, are still in dispute. In children the main symptom is vomiting, while in adults dysphagia, retrosternal discomfort, and regurgitation are the complaints. Malnutrition is seldom seen in adult patients but is frequent in children. Pulmonary complications such as lung abscess and aspiration pneumonitis are not infrequent. Roentgenograms establish the diagnosis. Routine posteroanterior and lateral chest films often will show a distended esophagus filled with food and fluid (fig. 10). The air fluid level should not be confused with a pleural effusion. A roentgenogram after barium reveals a dilated esophagus, either fusiform, flask, or sigmoid-shaped, and a sharp, pointed narrowing at the esophagogastric junction. Esophagoscopy is seldom necessary for the diagnosis of cardiospasm in children. Treatment with atropine, nitrites, or other antispasmotics has had generally poor results except in patients with minimal or early stages of the condition. These drugs can be tried for a week or so, but if there is no response, dilatations should be attempted. If this does not relieve the condition, an extramucosal esophagocardiomyotomy should be done shortly after, before secondary changes in the esophagus progress.

SUMMARY

The more common congenital anomalies of the esophagus and their diagnosis and treatment have been described in order to acquaint the practitioner with the pertinent facts of each. Such knowledge is important to early and proper diagnosis, so that

surgical treatment can be instituted early and the mortality and morbidity resulting from these conditions decreased.

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RHODE ISLAND COMMENDS CAPT. JOHN L. ENYART (MC) USN

Capt. John L. Enyart (MC) USN and the staff of the U. S. Naval Hospital, Newport, were honored by a resolution passed by the General Assembly of the State of Rhode Island on 16 March 1955. The resolution reads as follows: "Commending the commanding officer, Captain John Leslie Enyart (MC), United States Navy, and the personnel at the United States Naval Hospital at Newport, Rhode Island, for precision action in coordinating the rescue work when explosion at sea upon the U. S. S. *Bennington,* last May, proved that efficient organization is essential to life saving."

BLOOD GROUPING DISCREPANCIES

ALBERT M. RICHMOND, *Colonel, MC, USA*
FRANK W. CHORPENNING, *Lieutenant Colonel, MSC, USA*
JOHN W. MOOSE, *First Lieutenant, MSC, USA*
GEORGE B. EDMONSON, *First Lieutenant, MSC, USAR*

TWO DIFFERENT blood group determinations for the same person have not been uncommon,[1,2] yet it is well established that the blood group of an individual does not change.[3] The many likely sources of error have been stressed repeatedly.[1-4] These errors are undoubtedly accentuated when mass blood groupings are performed by short-cut methods and when many different laboratories, employing different technics and antiserums, are involved. It has long been realized that such a situation occurs in the armed services and in certain other organizations, such as those for civil defense. In spite of this, a search of the literature yielded only two critical studies of the extent of such misgrouping.[5,6] The more recent of these was a small restricted series. Apparently no organized program exists for searching out and correcting errors in grouping as reflected on identification tags and medical records. In the armed services there have been many local efforts in this direction but the application of such studies to standardization of technics has been less than could be desired.

In the interests of assessing the gravity of the situation and suggesting corrective measures, a broader study using the most modern technics and antiserums seemed indicated. Because the blood bank of this laboratory serves a large area and its donor source embraces both Army and Air Force units we have had an opportunity to make such a study.

SELECTION OF THE STUDY SERIES

For purposes of the study it was necessary that the series consist of a large group of American soldiers and airmen, that nearly complete coverage of the group be attained, and that the operation of other factors be essentially random. The only persons excluded were those whose blood group had already been rechecked by our blood bank. Units were selected at random and almost all personnel of the units were examined. In all, 2,050 persons in 27 different military units were studied. The great majority of these were young men recently inducted into service from wide-

From 4th Medical Laboratory, APO 180, New York, N. Y.

spread American sources. In the main, blood group records on these men depended on tests performed at induction stations and reception centers where only a simple slide technic had been employed in mass grouping. An undetermined but undoubtedly very small number had been subjected to confirmatory grouping prior to this study.

METHODS

A mobile team visited each unit at a predetermined time and collected venous blood from individual members as scheduled. A roster was prepared at this time by our personnel and a number assigned each person, who was then given a tube bearing the same number in which his blood specimen was collected. At the same time the individual's identification tags and immunization register (Form 8-117) were examined and blood group data from them recorded on the roster. The blood specimens and roster were taken to our laboratory where grouping and typing tests were performed.

Each specimen was examined by the ABO blood group slide test, backtyping* technic, the slide test for Rh typing, and the Rh modified tube test. The ABO blood group slide and backtyping procedures were performed by different technicians. A test for Rh_o variants (D^u), employing Coombs serum, was performed on all Rh-negative Negroids and Mongoloids except for the first 474 persons examined.

The ABO blood group slide tests were performed by placing a small drop of blood on a microslide, adding a large drop of National Institute of Health approved anti-A or anti-B grouping serum, and mixing thoroughly with an applicator stick. Cell concentrations approximated 10 percent. Readings were made from three to five minutes after incubation with occasional tilting of the slide, and negative slides were observed after 15 minutes before being discarded. Results were entered on the roster.

Backtyping was done by placing 0.2 ml. of the inactivated serum to be tested in a small tube and adding one drop of a known two percent cell suspension. Then the mixture was shaken thoroughly and centrifuged for two minutes at 150 g (about 900 r. p. m. in our centrifuge), after which the cells were resuspended gently and observed for agglutination.

All serums were tested against both group A, rh(cde) cells and group B, rh(cde) cells in this manner. In the event results of the ABO blood group slide test and the backtyping did not agree, a tube test also was performed and the foregoing tests were repeated. This procedure always resulted in satisfactory resolution of any discrepancy.

*In blood typing the unknown cells are typed with known serum but in backtyping unknown serum is typed with known cells.

The Rh-factor slide test was performed with high-titered, protein-fortified, incomplete type anti-Rh_o(D) typing serums which were specifically recommended for the slide test and had been approved by the National Institute of Health. All tests were done by placing two drops of a 40 to 50 percent fresh cell suspension in homologous serum on a microslide, adding a drop of antiserum, and incubating on an illuminated warming box for about two minutes. The box maintained surface temperatures on the glass plate from 40° to 45° C., resulting in an estimated incubation temperature of about 37° to 39° C. Slides were tilted back and forth during incubation and observed for the presence of agglutination. If the blood was positive, this usually occurred in less than one minute. If no agglutination appeared, slides were kept under observation until drying began to interfere.

Performance of the modified tube test for the presence of Rh_o(D) consisted of placing one drop of typing serum in a 12 by 75 mm. tube and adding two drops of a cell suspension of about 2.5 percent. Then, mixing thoroughly, incubating in a water bath at 37° C. for 15 minutes, and centrifuging at 150 g (900 r. p. m.) from one to two minutes. Positive agglutination determinations were made by observation with the naked eye and negative results were checked microscopically.

The procedure for the D^u test was identical with that described in the pamphlet accompanying the reagent (antihuman serum for the Coombs test).

All results were entered on the roster, which was then filed pending analysis at completion of the study.

RESULTS

Of the 2,050 persons examined during the study, 180 or 8.8 percent were found to have a blood group different from that recorded on their identification tags. These were believed to be original errors, as distinct from errors in our testing, because of the careful repeat testing employed in this study, and because our observed error during this same period was less than 0.012 percent. This incidence of error in our laboratory was established by checking the agreement of slide and tube testing with backtyping and with repeat testing.

In each blood group the percentage of persons whose blood was misclassified is given in the last column of table 1. It can be seen that the highest proportion of misclassifications occurred in those having group AB blood, followed by those having group B or A blood. The lowest proportion of misclassifications occurred in those having group O blood.

On the other hand, the largest number of classification errors occurred in those with group A blood, and the remainder of the errors were distributed about equally among those with the other three blood groups. This same phenomenon was observed by one of us (A. M. R.) in a similar but unpublished study previously conducted in the Fourth Army area in the United States.

TABLE 1. *Discrepancies between true blood group and recorded group**

True blood group	Originally recorded group	Number correct	Number of errors	Total	Errors within group (percent)
A	A	693		693	
	O		76	76	
	B		12	12	
	AB		3	3	
Subtotal		693	91	784	11.6
B	B	191		191	
	O		20	20	
	A		9	9	
	AB		3	3	
Subtotal		191	32	223	14.4
O	O	934		934	
	A		19	19	
	B		10	10	
	AB		2	2	
Subtotal		934	31	965	3.2
AB	AB	52		52	
	A		13	13	
	B		10	10	
	O		3	3	
Subtotal		52	26	78	33.3
Total		1,870	180	2,050	8.8

*Based on a series of 2,050 persons, retested in our laboratory, and compared with the group recorded on the identification tags.

A determination as to what proportion of the observed grouping errors were due to clerical mistakes would be of great value. Such a mistake, once made, is difficult to trace. It was possible to examine the records of persons in this study for clerical discrepancies between the information on the register and on the tag. There were 10 such discrepancies, five appearing to be errors on the tag and five on the register. These could be expected to repre-

sent only a portion of the total clerical error, because many would have been previously corrected and errors made on both records could not be detected.

TABLE 2. *Discrepancies between true Rh type and recorded type**

Group	True Rh type	Originally recorded Rh type	Number of errors
O	+	−	6
	−	+	5
Subtotal			11
A	−	+	5
	+	−	1
Subtotal			6
B	−	+	1
Subtotal			1
Total			18

Rh factor only

Rh type	Recorded type	Number of errors	Percent error
Rh neg.	Rh pos.	11	
Rh pos.	Rh neg.	7	
Total		18	7

*Based on 256 persons, whose records included Rh type information, and who were retyped in our laboratory. Positive and negative signs refer to Rh type as determined with anti-D typing serum.

Because of the practice of performing Rh typing within the Air Force, these data also were collected. The Rh type was included in the records of 256 members of the study series (2,050). Among these, differences between the recorded type and our results occurred in 18 instances, or seven percent. These errors had no correlation with the grouping errors but, rather, the greatest incidence was correlated with the group showing the greatest frequency (Group O). The distribution of error is shown in table 2. The sample is of insufficient size to determine the incidence of any specific kind of discrepancy.

DISCUSSION

The extent of blood grouping errors in Army and Air Force troops can best be assessed by examining the data recorded on identifi-

cation tags and ascertaining the distribution of error among the various blood groups. The advisability of having the blood group recorded on the identification tag is not within the scope of this study, but if it is, the correct blood group obviously should be recorded.

If the percentage of errors were reasonably low, or if properly selected universal donor blood were to be given, the current situation as reflected by this study would be of little importance. Because, however, about one in every 10 persons has an erroneous entry on his identification tag (table 1), and there is no assurance that universal donor blood always will be available in sufficient quantities, definite steps should be taken to correct the situation.

TABLE 3. *Incidence of blood grouping errors compared with the frequency of the group*

Blood group	Frequency (percent)	Number of errors	
		Observed	Expected*
A	38.2	91	68.8
B	10.9	32	19.6
O	47.1	31	84.8
AB	3.8	26	6.8
Total		180	180.0
$\chi^2 = 103.26$			

*Based on the correct percentage distribution (frequency) of blood groups in the entire series (2,050).

If the factors governing misclassification were operating in the same manner regardless of the true blood group involved, one would expect the 180 misclassifications to have been distributed among all blood groups in the same proportion as correct classifications were distributed. The observed and expected distributions are presented in table 3. Applying the chi-square (χ^2) test to this data, a value of 103.26 is obtained. With three degrees of freedom, this indicates that there is little probability of obtaining the observed distribution of error among the various blood groups due to chance alone, and that causes other than random ones are responsible for the observed difference. Further, misclassifications within a group have not been distributed uniformly among the other three groups. For example, of the 91 persons with group A blood misclassified, 76 were now assigned to group O, 12 to group B, and three to group AB. Were the misgrouping merely a matter of chance, it would be expected that the mis-

classified persons would have been assigned to groups as shown in table 4. Again the values of χ^2 indicate there is little likelihood that many of the grouping errors were due to the same random causes such as clerical errors. Undoubtedly, careless observation and clerical mistakes contribute to the total error, because the only way that a true group A blood could be classified as group B blood would be if cells bearing the A agglutinogen failed to agglutinate with anti-A grouping serum while simultaneously yielding false agglutination with anti-B grouping serum. This is a rather remote probability. Including both groups A and B, a total of 21 errors could belong in this category, which is 11.7 percent of the total error observed.

Far fewer errors occurred in the classification of those with group O blood (table 3) than would be expected from a chance distribution of errors (observed 31; expected 84.8), while the reverse is true in those with the other three blood groups. The fact, however, that some errors in classification of those with group O blood did occur requires exploration of the possible causes. Because the identification of blood as belonging to group O is dependent on the absence of agglutination, misclassification of those with group O blood must be attributed to false agglutination or clerical error. The latter, especially if lower-case letters ("a" and "o") were used either in marking slides or in recording results, could cause a correctly grouped O blood to be recorded as an A, or vice versa. Clerical errors involving lower-case "a" and "o" appear to be negligible, because if there were many errors of this sort one would expect to find a significantly higher proportion of group A blood samples than of group B blood samples misclassified as group O. Although the proportion of group A samples was greater than that of group B, the difference is not significant. Hence, misclassification of group O blood samples must be due principally to false agglutination.

Agglutination, or what appears to be agglutination, of group O blood may occur due to autoagglutination, bacterial contamination, rouleaux formation, or clotting,[3,7] thus causing a true group O blood to be identified and recorded as group A, B, or AB blood. All of these causes could have been involved and there is no evidence definitely pointing to any particular one. It seems unlikely that bacteriogenic agglutination could have been a significant factor, because blood samples were fresh, and antiserums were used up rapidly and not allowed to become old. There is a theoretic reason to suspect clotting because mass methods use unclotted peripheral blood without adding an anticoagulant. Also, these preparations are prone to drying.

It is seen in table 3 that failure to detect agglutination occurred much more frequently than would have been expected on the basis

of chance. This fact alone is of importance in arriving at appropriate recommendations for the future reduction of mass grouping errors. It becomes clear that a greater number of the errors were due to failure to observe agglutination than were due to all other causes together. There were 76 group A bloods and 20 group B bloods recorded as group O, in addition to which 26 group AB bloods were misclassified, making a total of 122 errors (67.7 percent) attributable to failure to detect agglutination.

TABLE 4. *Incidence of blood grouping errors within blood groups*

True blood group	Originally recorded group	Number of Errors		χ^2
		Observed	Expected*	
A	O	76	30.4	104.05
	B	12	30.3	
	AB	3	30.3	
Total		91	91.0	
B	O	20	10.7	13.80
	A	9	10.7	
	AB	3	10.6	
Total		32	32.0	
O	A	19	10.4	13.81
	B	10	10.3	
	AB	2	10.3	
Total		31	31.0	
AB	A	13	8.7	5.97
	B	10	8.7	
	O	3	8.6	
Total		26	26.0	

*Assuming a chance or random distribution due to other than technical causes, such as clerical ones.

It is evident, therefore, that a very large proportion of the errors currently being encountered could be prevented if the factors which inhibit agglutination were eliminated. These are hemolysis, use of weak antiserums, and insufficient cell contact.[3,7] Because the incidence of hemolysins is not high and because actual tests in this laboratory have shown that antiserums currently used in the armed services are very potent, it is believed that lack of sufficient cell contact is the most likely cause. In our laboratory

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we have observed that failure to secure adequate cell contact by frequent tilting of the slide and by a sufficiently long period of incubation can result in agglutination being missed. A knowledge of the mass methods usually employed, coupled with the foregoing, leads us to conclude that most of the errors observed were likely caused by improper technic such as too rapid reading, or insufficient tilting of the slide. A great part of this is inherent in the use of mass technics and poorly trained technicians. Therefore, modification of the technic to assure more careful incubation and better indoctrination of technicians are essential if the situation is to be improved. Another approach would be to initiate a program of repeat testing.

SUMMARY

In order to determine the extent of blood grouping errors resulting from the employment of mass technics, the blood of 2,050 American soldiers and airmen who were selected essentially at random was examined. The blood groups were determined by carefully confirmed testing and the results compared with previously prepared records. Discrepancies between our results and those previously recorded occurred in 180 instances, or 8.8 percent.

Most of the grouping errors (67.7 percent) seemed to be due to failure to observe agglutination with potent specific antiserums, even though the agglutinogen was later proved to have been present. It is suggested that this was probably due to too rapid or careless reading and insufficient tilting of the slide.

It was possible to examine the blood of only 256 persons for Rh type discrepancies, because such information had been included in the records of only that number. Of these, 18 (seven percent) showed recorded errors in Rh type.

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FREE AMINO ACIDS IN THE BLOOD AND ORGANS OF MICE IN SHOCK

VICTOR ROSS, *Ph. D.*
DAN H. MOORE, *Ph. D.*

SEVERAL investigators have demonstrated that a rise in total amino acid nitrogen occurs in blood following induction of shock by hemorrhage,[1-3] by scalding,[4-7] and by clamping,[8] and that the rise is greater with increasing severity of the state of shock.[2,5,9] This has been ascribed to increased protein breakdown in the peripheral tissues and a failure of the liver, during shock, to deaminate and to assimilate amino acids.[2] While it has been observed that the total amino acid nitrogen in the liver and muscle also increases during shock (from hemorrhage),[10] study of the individual amino acids in the tissues of shocked animals appears to have been limited to the blood of the scalded rat.[11]

The present investigation was concerned with the amino acids present in several organs, as well as in blood, of mice in a state of shock produced by scalding. Quantitative measurements were not made, the primary interest being whether the tissues of scalded mice would or would not contain amino acids not present in the corresponding tissues of normal mice as revealed by chromatographic examination.

METHODS

Groups of C57 black mice, weighing 25 grams each and up to 25 in number in each experiment, were fasted 20 hours and anesthetized with ether. Both hind legs and thighs were submerged in water at 70° C. for 10 seconds and the animals then held at 35° C. for two hours. The mortality was 50 to 60 percent. All survivors were in a state of severe shock. After anesthetization the blood was collected and allowed to clot; the organs were placed in beakers held in a mixture of alcohol (ethanol) and solid carbon dioxide. Control mice were treated similarly except for the 70° C. and 35° C. exposures. Only two to three drops of blood

From the Departments of Biochemistry and Microbiology, College of Physicians and Surgeons, Columbia University, New York, N. Y. Dr. Ross is now at Francis Delafield Hospital, New York, N. Y.

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were obtained from each shocked animal compared with nine to 11 drops from each control.*

For the extraction of amino acids, serum was diluted with four volumes of absolute alcohol, let stand over night in the ice box, and centrifuged. Weighed quantities of dried tissues were extracted with anhydrous ether followed by anhydrous alcohol to remove lipids. Amino acids were then extracted by grinding in 80 percent alcohol. While some loss may have occurred in the course of removing lipids, these are assumed to have been alike for control and treated animals' tissues because the operations were identical.

Two-dimensional chromatograms were employed according to Dent's[12] adaptation of the method of Consden and associates,[13] the equivalent of 0.10 ml. of serum and of 7.5 mg. of dry tissue being spotted. Dent's map of spots was used to help identify the spots and in addition the following compounds, singly or in groups, were examined by themselves, or after being added to tissue extracts in order to make identification more certain: aspartic and glutamic acids, glycine, serine, alanine, asparagin, glutamine, leucine, valine, tyrosine, tryptophan, phenylalanine, histidine, histamine, glutathione, proline, carnosine, lysine, hydroxylysine,** arginine, threonine, diaminopimelic acid,** taurine, beta-alanine, and ornithine. All operations, from spotting to final examination of the paper chromatograms, were carried out simultaneously for control and experimental extracts of a given tissue, thus facilitating an estimate to be made of the intensities of the colored areas obtained by spraying with ninhydrin. These estimates are not to be considered as possessing quantitative accuracy; they are included to supplement the qualitative data showing the particular amino acids observed to be present in a given tissue and to illustrate a rise in concentration in a number of them following scalding.

RESULTS

Table 1 lists the amino acids and related compounds which were found in the various extracts. The estimated intensities are the averages of six experiments in the case of serum and of three in the case of the other tissues. Additional experiments were done but were not included because one or more amino acids had been added as markers; their inclusion would not alter the results.

*The nonprotein nitrogen content of blood from three groups of scalded mice was 69.0, 104.5, and 83.4 mg. per 100 ml. The average value for the control mice was 47.1 mg. per 100 ml. with no value differing by more than 1.5 mg. from this average.

**Supplied by Dr. James R. Weisiger of the Rockefeller Institute for Medical Research and Dr. L. D. Wright of Sharp and Dohme, respectively.

TABLE 1. *Free amino acids* in serum and organs of mice***

	Serum		Spleen		Liver		Kidney		Brain		Muscle		Lung	
	C	S	C	S	C	S	C	S	C	S	C	S	C	S
Alanine	4	6	5	7	6	6	5	6	5	5	5	5	4	4
Alpha-aminobutyric acid			x	x	2	2	1	2	<1	<1				
Arginine			2	3					2	2	1	2		
Aspartic acid	1	1	5	5	2	3	3	3	5	4	3	3	3	3
Beta-alanine			x	x	1	2	1	1						
Carnosine											2	1		
Ethanolaminephosphoric ester			5	6	2	2	x	x	3	3	1	1	4	3
Gamma-aminobutyric acid									7	7				
Glutamic Acid	3	5	6	6	5	5	5	5	6	5	5	5	6	5
Glutamine	5	6	4	5					4	3	4	4	3	3
Glutathione			x		1	1								
Glycine	3	3	5	6	5	5	5	5	5	5	4	4	5	5
Leucine	3	4	6	6	3	4	5	5	5	4	2	4	1	1

TABLE 1. *Free amino acids* in serum and organs of mice***—Continued

	Serum		Spleen		Liver		Kidney		Brain		Muscle		Lung	
	C	S	C	S	C	S	C	S	C	S	C	S	C	S
Lysine	2	3	3	4	2	2	2	2	3	3	2	4	1	1
Methionine			1	x	3	4	2	3			x	x	1	2
Ornithine			x	x		x								
Proline			3	3		x	1	1	x	x	x	x		
Serine	1	3	6	6	1	2	3	4	4	4	3	4	2	2
Taurine	4	5	6	6	5	5	5	5	5	5	6	7	5	5
Threonine			3	5	x	1	2	2	2	2	x	x		<1
Tyrosine		1	3	3	1	1	1	1	2	1	x	x		<1
Valine	3	4	4	5	2	4	4	4	3	2	2	4	<1	<1

*And taurine, carnosine, and glutathione. C, control mice; S, shocked mice.

**1, very faint; 2, faint; 3, slight; 4, less than moderate; 5, moderate; 6, strong; 7, very strong; x, seen irregularly.

A blank space signifies no spot was seen.

Serum. Tyrosine was absent from the chromatograms of normal mice and present in those from the scalded animals. All the amino acids present in serum, namely aspartic and glutamic acids, glycine, serine, alanine, lysine, leucine, valine, taurine, and glutamine, were present in all the other tissues as well, except that glutamine was absent from liver and kidney.

Spleen. Glutathione was present irregularly in extracts of the spleen from control animals but was never seen in those from shocked mice; a spot in the position of methionine sulfoxide* was always present in the former but irregularly in the latter. Other compounds, in addition to those detected in serum, were threonine, tyrosine, arginine, proline, beta-alanine, alpha-aminobutyric acid, ornithine, and ethanolaminephosphoric ester. The last yielded a spot in chromatograms of splenic extracts which was stronger than in that from any other organ.

Liver. Threonine, which appeared irregularly in extracts from control animals, was regularly present in those from scalded mice, while proline and ornithine, which were not found in the control extracts, were detected irregularly in the experimental animals. In addition to the compounds found in control serum, threonine, tyrosine, beta-alanine, methionine sulfoxide, glutathione, alpha-aminobutyric acid, and ethanolaminephosphoric ester were present in liver extracts.

Kidney. The chromatograms of this organ extract from control and scalded mice were similar. The compounds detected in control kidney tissue were the same as in control liver tissue except that the former contained no glutathione and did contain proline. Neither glutamine nor arginine could be demonstrated in kidney and liver extracts. Except that arginine was also absent from lung extracts this was in contrast to all the other organs examined. The absence of these two compounds may have been the result of strong arginase and glutaminase activity. The latter enzyme, however, is present in brain also, and a spot for glutamine was always present in chromatograms of this organ. Arginase activity should have been reflected in the appearance of ornithine but this acid was not found in kidney tissue from control or scalded mice nor in normal liver tissue, although it was present irregularly in liver from scalded mice. Schwerin and coworkers[14] found 10 and 35 mg. of glutamine per 100 grams of mouse kidney and liver, respectively; the quantity in the latter

*Methionine sulfoxide was probably formed from methionine during the spotting operation. Crumpler and associates (Crumpler, H. R.; Dent, C. E.; Harris, H.; and Westall, R. G.: β-aminosobutyric acid (α-methyl-β-alanine): new amino-acid obtained from human urine. *Nature*, London 167: 307-308, Feb. 1951) reported finding a new amino acid, β-aminoisobutyric acid, in the position occupied by methionine sulfoxide. It is possible, therefore, that the new compound, rather than methionine sulfoxide, was present in our chromatograms.

organ, when calculated for that spotted in the present experiments, should have been detected.

Brain. The chromatograms of control and shocked mice were, qualitatively, indistinguishable. Besides the compounds detected in normal serum, there were observed spots representing threonine, tyrosine, arginine, proline, alpha-aminobutyric acid, gamma-aminobutyric acid, and ethanolaminephosphoric ester.

Leg Muscle. The patterns of the two groups of animals were alike. Besides the amino acids seen in serum chromatograms there were threonine, tyrosine, arginine, proline, methionine sulfoxide, ethanolaminephosphoric ester, and carnosine. Carnosine exerts a depressor effect on blood pressure[15,16] but it appears to play no role in shock because it was not found in the blood of scalded mice.

Lung. Tyrosine and threonine were absent in control extracts but appeared in those of scalded mice. Except for methionine sulfoxide and ethanolaminephosphoric ester, the extracts from control mice yielded the same chromatograms as those from serum; this made the resemblance to serum greater than that in any other organ.

DISCUSSION

Only in the serum, where tyrosine appeared, and in the lung, where both tyrosine and threonine were found in the shocked mice, does there appear to have been a qualitative change in the free amino acid pattern following induction of shock. The meaning of these changes is not clear at this time. The simplest explanation may be that the concentration of these two amino acids had increased sufficiently to make detection with ninhydrin possible. This view receives support from the fact that there were a number of instances in which the concentrations of amino acids increased in the tissues of the shocked mice. An exception to this is the brain where, in the case of six compounds, the concentration decreased. No amino acid regularly present in control tissue was lacking in the corresponding tissue from scalded mice.

It is of interest that no spot, other than those representing glutamine and carnosine, present in chromatograms of unhydrolyzed specimens, failed to appear after hydrolysis of the tissue extracts from either the control or the scalded animals. Although ninhydrin does not detect all peptides, the fact that there was also no evidence for intensification of the color of any spots (except as expected from the hydrolysis of glutamine and carnosine) suggests that, if peptides soluble in 80 percent alcohol were present in the extracts, they must have been so in very small amounts. This suggests that such compounds also do not play a part in the shock syndrome.

SUMMARY

Only in blood and lung extracts was there a qualitative change in the free amino acid paper chromatograms of scalded mice; this consisted in the appearance of tyrosine in the former, and of tyrosine and threonine in the latter.

In no case was an amino acid observed in the control animals' tissues which failed to appear in the chromatogram of the corresponding tissue from scalded mice.

Hydrolysis of the extracts provided no evidence for the presence of peptides in the extracts from control or shocked animals' tissues. It appears, therefore, that carnosine and other peptides play no part in shock produced by scalding.

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MILITARY PSYCHIATRIC PROBLEMS IN PEACETIME

L. EITINGER, *M. D.*

MILITARY psychiatric problems are so extensive that in a brief report one can only indicate the most important points of interest. I have therefore concentrated exclusively on concrete and simple problems encountered daily in the Norwegian military service and in this clinic.

Since the beginning of our military age responsible military leaders have made the reasonable demand that the men who were to bear the direct strain of battle and life in military service be in relatively satisfactory health. Parallel with the building up of modern armies, the medical selection system has also developed systematically. Concentration has been on the soldiers' physical soundness. Although symptoms such as anxiety and panic were known in former times, professional military men were primarily interested in knowing whether or not the soldier had good feet and full movement of his fingers in order to fire a rifle. It did not occur to anyone to correlate these problems in selection board examinations. The very alarming number of cases of nervous breakdowns, shell shock, et cetera, during two world wars made the problem exceedingly real. It was only natural that ways of avoiding these breakdowns were urgently sought. Because psychiatric therapy was inadequate, emphasis was placed on prevention as early as possible, *i. e.*, before service began. This led, in the first place, to a more or less noncritical rejection of all recruits who showed even insignificant symptoms.

It is not strange that such rigorous demands met with some resistance, especially after the war when it became evident that even the most select soldiers could experience breakdowns. In 1943, when the military services of the United States still rigorously rejected all recruits with the slightest indications of nervous symptoms, Sjögren[1] pointed out that it was not only those who were already psychically strained who broke down, but that the milieu—military life itself—played a big part both in a positive and negative direction. Since then, American studies

From the Psychiatric Clinic of the Oslo University, Vinderen, Oslo, Norway, and the Norwegian Joint Military Medical Services.

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of the problem, such as made by Sharp,[2] Aita,[3] Egan,[4] Chambers,[5] Braceland,[6] and Menninger[7] showed that too many recruits had been rejected who could have rendered valuable service in the military forces.

In spite of this recognition, it is indeed unquestionable that a psychiatric opinion and appraisal at the selection board examinations can be of great value. It is only necessary to be a bit cautious concerning the standards set up.

STANDARDS OF COMPARISON

Instead of trying to eliminate all those who in any way might become mentally ill during service, emphasis now is chiefly on the obviously unfit. Hamburg and associates[8] examined 96 soldiers who were admitted to the psychiatric department in the course of their first 30 days of military service. By comparing these 96 with a group of soldiers who had at least one year of uninterrupted service, significant differences concerning earlier sicknesses, especially of a psychiatric nature, and adjustment to the working life were discovered. This corresponds fairly well with my study in 1953 of 439 soldiers who were at the conclusion of their period of service without having had to apply for psychiatric assistance and 165 soldiers who either had been admitted to this clinic or had been examined in the outpatient department (table 1).

As noted in table 1, there are quite distinct differences in the group with a positive family history (*i. e.,* children who have not grown up with their parents—because of divorce or for some other reason, and children with parents from a rather difficult milieu—the father an alcoholic, et cetera). Furthermore, we find differences when the difference concerns "positive premorbid personalities" (*i. e.,* all who have had nervous disturbances as children or adolescents, registered by their sensitiveness, hypersensitiveness, or isolationistic and autistic tendencies), poor school marks, unstable working conditions, and perhaps some lack of social responsibilities (if one is willing to recognize children born out of wedlock as a proof of such weakness). Factors which are alike for both the examined groups are the person's place in the family, the parents' occupation, and the number of military punishments the person has received.

SIGNIFICANCE OF PEACETIME ADJUSTMENT

Cavanagh and associates[9] also came to similar conclusions. They compared a group of 242 military persons who (during peacetime conditions) completely failed in their work with 410 military persons without psychic or disciplinary difficulties. Those from the former group came from broken homes more often than those in the control group. The "problem" group had had several adjustment difficulties in school and working life and had, on an aver-

age, a lower intelligence quotient than the control group. In spite of these undoubtable quantitative differences between the various groups examined, the results hardly give any definite grounds on which to base a reliable selection procedure.

TABLE 1.

Factors in history*	"Normal" material (439 subjects)	"Problem" group (165 subjects)
	Percent	*Percent*
Illegitimate birth	2.9	3.6
Hereditary predisposition	4.7	43.0
Positive family history	20.7	63.6
Positive premorbid personality	10.4	81.8
School difficulties	2.1	15.1
Unstable working conditions	6.8	37.5
Having illegitimate children	0.6	2.4
Not present at the selection board examinations	6.5	32.1
Total	439	165

*See text for explanation of terms.

No one can in all earnestness demand that *everyone* liable to be called up for military service with positive symptoms of a disturbed family life, unstable working conditions, or poor school marks, for example, shall be rejected and considered incompetent for military service. Neither should a candidate be rejected because he volunteers the information that he is sensitive and/or emotional. On the contrary, one should undoubtedly accept for service the subjects in whom one finds an accumulation of several factors; likewise those with distinct nervous disturbances should be accepted, but followed with the utmost care.

Briefly, to sum up the results one must acknowledge that the psychiatrist's importance in the actual selection board conclusions (rejected or accepted) is not as great as originally supposed. The main point I want to clarify is that the major effort of preventive work should not be performed during the selection board sessions, but at a later date, that is, during the military life of the individual serviceman.

BASIC NEEDS vs. MILITARY DEMANDS

It is hardly necessary to stress the importance of satisfying the individual's biological and social needs. When it applies to

the former, there has never been any doubt of their importance for the soldier's competence. Here I will call to mind the old Norwegian proverb that "no one becomes a hero who has no food and drink." When it comes to social requirements, the realization of their importance for the individual's welfare has been considerably more of a problem. Without hurting anyone's feelings, one can safely say that the military institutions never have been especially famous for considering the individual's special capabilities and talents. This inflexibility in considering each person will undoubtedly lead to failure in satisfying specific social needs. This weakness can most certainly be the main cause for releasing or conditioning the outbreak of nervous disturbances.

From the previously mentioned examination of 604 soldiers, it was observed that a number of fairly important social requirements had been neglected by the military authorities.

THE RECRUIT'S VIEWPOINT

Let us focus our attention on the first impression of the armed services that a recruit gets his first day. Only 19 of the 604 said that they had received a good first impression. More than one third of this group informed us that the attitude of officers and noncommissioned officers, which was unsympathetic, was the main reason for this judgment. A similarly large number also reported that they had not received any explanation whatsoever concerning the meaning of military service or why they had to carry out the different orders. Of those who considered that they had received some sort of explanation, nearly 80 percent said that the briefing was insufficient because it usually only referred to the importance of strict military discipline or to the threat of punishment.

Some understanding as to whether the servicemen believed that they had been justly or unjustly treated was obtained by determining their outlook on the punishment they had received and by evaluating answers to questions as to whether their sense of justice had been injured during service. The number who considered that the punishment was unfair ranged between a few up to two thirds in the different military services. Only about 10 percent reported that their sense of justice had not been injured. The two things to which the soldiers reacted most strongly were (1) being disciplined by somebody who was not a neutral judge, and (2) being punished collectively for the wrongdoings of other persons.

RECOGNITION FOR GOOD DEEDS

Most of the servicemen reported that they were reprimanded when they made mistakes but never praised when they did things

well. However, most of them realized that too many compliments only did harm. At the same time they pointed out the poor psychology in the fact that they were treated too harshly and severely in the first period of their recruit training when they were young, timid, and unsure. During this particular period of elementary drill and weapon exercises a few compliments and words of encouragement would have meant a great deal to their morale and feelings and would have been of the greatest importance.

Only from six to 30 percent of those examined (which varied within the different services) considered that the civilian population thought well of men in uniform. The lack of social recognition was perhaps a great frustrating factor and appears to be a more serious problem than one would imagine from the very positive attitude that most of the newspapers seem to express.

IMPORTANCE OF JOB SATISFACTION

One of the most important social factors is certainly one's satisfaction with one's own work. For service personnel this problem is definitely greater than in a civilian occupation, because they find themselves in an organization where accomplishment of the imposed work is compulsory. This situation implies a very serious frustration. If, in addition, the work seems meaningless, the dissatisfaction is naturally much worse to bear than under "free conditions."

Our studies revealed the unpleasant facts that from 20 to 40 percent of the men were far from satisfied with their training, from 10 to 60 percent were dissatisfied with the work they had to do, and from 80 to 100 percent (which varied in the different services) believed that the time spent in uniform was too long in relation to what they actually learned.

These examples, of which one could name many more, illustrate and sufficiently prove my thesis that the services do not consider seriously enough the importance of social well-being and contentment.

INCIDENCE OF PSYCHIATRIC BREAKDOWNS

The number of psychiatric cases in the military services must be considered to have increased since 1945. This is, first and foremost, because of the longer compulsory service period, and possibly also because of stricter classifications and more assignments by the selection board committee. This assertion might seem contrary to my claim that the psychiatrists have gathered insufficient evidence to eliminate candidates who might suffer a breakdown. This contradiction, meanwhile, seems apparent only because so many other absolutely necessary psychologic requirements—which are needed and lead to success in the service life—were lacking. A published work by Hunt and associates[10]

—which analyzes in detail 537 "marginal psychiatric cases" studied during the entire period of military service—is very convincing. These men managed to complete their military service, but during the whole time they were a somewhat greater liability for the medical service and the welfare and combatant officers than the average soldier.

It is here that I have to touch upon the crux of the problem. Both the medical staff, the members of the welfare organizations and, last but not least, the combatant officers who have daily contact with soldiers and sailors need a certain amount of mature experience, understanding, and perhaps a little more of the right spirit and human touch to handle these somewhat different personalities in order to help them through their entire service period.

Evident shortcomings on these important qualifications are shown by our material—the 165 military persons who were either admitted to the University's psychiatric clinic or were treated at the clinic's outpatient department.

TYPES OF PSYCHIC DISTURBANCES

The first thing one notices when studying the diagnoses of these patients is that victims of circumstances and depressing conditions are more frequently represented in this group than in a proportionate control group. Neuroses and psychogenic disturbances constitute a good 60 percent of all diagnoses. The remainder—that is, not even 40 percent—is divided among the other diagnoses which include psychopathies, oligophrenias, schizophrenias, epileptic disturbances, et cetera.

Meanwhile, more important for our purpose than the actual academic diagnostic classification is the question of whether the actual disturbances have been caused by, conditioned by, or are unconnected with the military service. This grouping was undertaken on the basis of a detailed study and judgment of the patients' premorbid personality, adjustment to school and working life, the development of the illness, and adjustment to military and/or civilian life *after* the conclusion of treatment.

Classification of a patient into one of these three categories was not always easy to perform. In many instances there were strong objections against placing a patient in either the one or the other group. It is very difficult to decide the causes of psychiatric disturbances because numerous and very complex factors in a serious ensemble can produce mental disharmony. Meanwhile the question of military service as grounds for psychic disturbances is of such great importance both psychiatrically and socially that I believed I was justified in undertaking this classification. This is only mentioned to point out that in each particular case I have honestly tried to come to a tenable conclusion.

MILITARY SERVICE AS CAUSE OF MALADJUSTMENT

The first group, *i. e.*, the group in which the military service was the *direct* cause of psychiatric disturbances, proved to be the smallest, comprising only 12 (7.3 percent) of all examined. Here are boys who have adjusted themselves well in school and working life, and who have neither in childhood, during adolescence, nor in the beginning of their military service had difficulties of any kind. Because of a specific experience or erroneous employment, a defect appeared in their psychologic resistance with the result that failure of adjustment and neurotic reactions became evident.

For practical purposes in military medicine, and especially in the preventive field, it is interesting to know what factors led to the breakdown of these 12 military persons. With the reservations previously mentioned, it can be maintained that two developed their depressive neuroses because of punishments which they considered extremely unjust. With six patients the problem of wrong employment was the main cause. Three thought that the officers' uncomprehensive attitude was the cause of their difficulties, while one apparently reacted to the civilians' dismissing attitude in a (from his point of view) rather notorious garrison town.

Concerning those patients in whom wrong employment had been the cause of the neuroses, it was particularly interesting to follow them after the final treatment. Everything went well when the military authorities followed the clinic's advice concerning a change in employment. In cases where our advice was not taken, the neuroses was accentuated and, after a while, the patient was discharged as "inaccessible for therapy."

A typical example for the first group is a 21-year-old youth in the Navy who, before the psychiatric examination and treatment, had had five disciplinary retributions for different offenses. He was restless, sleepless, continuously at the doctor's office, could not concentrate, was pining away, and depressed. After being put into a new job he accomplished his work well without once having to consult a physician or coming into conflict with his superiors.

Even if this group, where one with relative certainty can assume the cause to be military conditioning, is relatively small, it shows with all desirable clarity that the treatment cannot only be purely psychiatric, but that it must be combined with administrative effort on the part of the military.

OTHER CAUSES OF MALADJUSTMENT

Group two (63 persons, *i. e.*, 38.2 percent) comprised men in whom military service was not considered to be the cause of the psychiatric disturbances under consideration. This group constituted more than one third of all examined and can be divided into

two main subgroups: (1) the persons who should not have been enlisted in the military service (mainly psychopathics and oligophrenics), and (2) persons in whom the developing factors had nothing to do with the military service but were mainly of a social or erotic nature. In addition there were a few cases of typical "endogenous" nature (schizophrenia and organic mental disturbances) where one must assume that the illness would have developed independent of the person concerned being in or out of the service.

In itself, it is not surprising that soldiers also can have conscious or unconscious conflicts *without any connection* with the military service. For these conflicts the servicemen need, just as other patients, psychiatric treatment and guidance. Each case should be judged individually and a general recommendation to send the patients home cannot be considered a rational and adequate solution for all these illnesses of clear psychiatric nature.

The last and undoubtedly most important group was made up of 90 military persons, *i. e.*, 54.5 percent of those examined. In this group we had, after examination of the case history, received the impression that the military service was only a contributing but still very important factor in producing the psychical disturbances. Diagnostically we find here that more than two thirds of the examined are suffering from neuroses and psychogenic disturbances. The reason for failing to adjust themselves seems in all cases to have a direct bearing on the military life. The personalities injured were on the average predisposed because their characters were affected by autistic tendencies and the like. Family disposition, in the form of heredity and/or of a disharmonious home, was also found to be over-represented in this group.

Of these 90, 34 were recommended to be discharged, 38 were retained in their service, and 18, in whom the final decision was postponed, were for the time being discharged and classified as temporarily unfit for service.

IMPORTANCE OF ADMINISTRATIVE DISPOSITION

We found that in the first group the administrative authorities' decisions with regard to employment were of great importance. The problem of correct assignment is even more significant with persons who are less capable of resistance. The administrative authorities should attempt to assist these cases with supporting and upholding psychotherapy, and with other positive efforts which each separate case indicates.

A typical case history of a patient concerns a seaman whose father was a drunkard and whose mother died when he was six years of age. The father married again, but the stepmother also died when the boy was comparatively young. The patient developed a sensitive and emotional disposition with a tendency toward depression. During military

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service he was "obliged" to marry and his wife continued to live with her parents. He experienced a number of neurasthenic symptoms, felt weak, was listless, tired, hypersensitive to noise, et cetera. He also complained that his father now lived alone and that this would result in a complete alcoholic relapse. The patient believed that this also would be his fault. Fortunately it was possible to arrange for him to be posted near his father (and wife). The medical officer not only kept his eye on the patient, but also on the father, and at the same time he tried to help the family socially. The combined psycho- and sociotherapy had a very good result not only for the effect on his military service but first and foremost for the patient's psychological health. (There is no doubt that a physician with less interest in the patient and his unit could not have accomplished the same results.)

Unfortunately there are numerous examples which prove that failure in the social medical service *after* psychiatric treatment results in the individual continuing to feel like a misfit, as shown in the following case.

The patient was born out of wedlock and grew up with his maternal grandmother. The mother was "nervous" and a cousin of hers was psychotic. The patient himself was quiet, reserved, shy, restrained, and had difficulty in making friends.

He was called up for military service where things went relatively well in the recruit school, and at first when he was serving in the vicinity of his home. He was then assigned to another garrison and, in the course of four or five months he was penalized eight times, in most instances because he simply walked off. He was sent for psychiatric examination after nine months of service. He was then restless, shy, blushed when anyone so much as looked at him, slept badly, was frightened, and pined away to the utmost. We recommended either a change of duty or complete release from further military service. Neither of these recommendations was followed. On inquiring we learned that the patient was still in the same post and that he spent most of his service time sitting behind bars.

CONCLUSIONS

What conclusions can be made from this rather meager material? In the first place the fact that there is so little material is in itself noteworthy. It shows that only a few of all those who need psychiatric assistance are referred to specialists. In a study I made in 1950[11] of military persons who had been discharged because of psychiatric disturbances, only about 20 percent of the men had been examined by specialists. This figure supports the necessity for more psychiatrists in the service.

In the second place, the material shows that a neurotic disturbance arising during military service does not necessarily lead to a decision of incompetence and therefore discharge. In other

words, psychiatric examination and treatment can give quite a "recruit-preserving" result.

In the third place, we find that it is not sufficient only to treat the men in a hospital, consequently removed from the conflict-developing milieu, without also attempting to modify the milieu. As a slogan and expressing matters to the extreme, I would say it thus: It is of no avail to fit a man into military service if one does not also seriously attempt to fit the military service to the man.

The latter is the military psychiatrists' most important problem: prevention of neuropsychiatric disturbances. Some points which affect this question are mentioned briefly:

The actual changeover from civilian to military life involves in itself many difficulties. This applies especially in a democratic society in which education stresses the development of the individual's freedom and his personal responsibilities. The atmosphere in and the whole construction of the military organization is contrary to civilian life. This sudden change from a democratic to an authoritarian life pattern has most certainly a great influence on the soldiers' mental life and health. It will, therefore, be of the greatest importance for a satisfactory adjustment that it is made as humanely as possible. The necessity of strict military regulations (where they really are necessary) must be clarified, that is, explained to all military personnel.

This implies that all procedures, instructions, regulations, traditions, et cetera, should be given an unprejudiced review. Only those rules and regulations which are necessary for the smooth functioning of the military apparatus should be retained. All others should—in the widest possible extent—be adjusted to fit the democratic spirit and the democratic mode of living which otherwise forms the basis of our social life. This requires that the officers' interest in the questions which are related to the above-mentioned problems is stimulated.

RECOMMENDATIONS

I am well aware that this problem cannot be considered as a direct task psychiatrists should take upon themselves. But they should, on the grounds of their understanding of human reactions, endeavor to awaken the command authorities' interest in this fundamental recognition.

Our material shows that the effect of the military service on the human mind in peacetime also can be of such a serious nature that it must be regarded as a direct reason for the development of some emotional disturbances.

Psychically well-equipped and healthy persons seem to be able to manage the mental strains of the military service without

becoming ill. Nevertheless, drawn-out, inadequate treatment on the part of the superiors or a markedly absurd duty assignment can result in abnormal emotional reactions in presumably mentally sound persons. To a far greater extent we encounter the outbreak of mental illness in such individuals who have already had, prior to their military service, a character trait which disposes to neuropsychiatric disturbances or who, in their upbringing, have had exceedingly unsatisfactory family relations.

The responsible authorities must so arrange the service life of recruits that they will be as little exposed as possible to serious strains which might cause mental illness to break out.

Every medical officer is taught and must adhere to universally accepted principles of general hygiene. Physicians are only advisers, and to some degree they also supervise all preventive efforts with regard to illness (for example, food, shelter, clothing, training, et cetera).

The preventive work in the mental hygiene field cannot be concentrated purely on the medical sector of military life. On the contrary, it is first and foremost the combatant officers who have the daily contact with the soldiers. It is therefore these who first of all should partake actively in the preventive field of mental hygiene. To get it started and understood a thorough and intensive training of all officers is needed. The main stress is to be laid on knowledge concerning the human mind, its variable vulnerabilities and its normal and abnormal reactions. The importance of the different factors which can cause the development of illness must be examined in detail with particular emphasis on the importance of sound occupation and placing in the right job which, for most persons, is one of the primary conditions for thriving.

Medical officers on their part should also be aware of the enormous responsibility which rests on their shoulders and also of the importance an adequate treatment has both for the individual and for the service as a whole.

Often the recently graduated physicians, who must perform the greater part of the daily medical work in the military service, cannot however be expected to have the necessary insight and experience in order to be able to undertake the double duty which today falls upon them, *i. e.*: to influence the combatant officers toward a more "mentally hygienic minded" attitude and treatment of their subordinates and to render the soldiers the necessary supporting psychotherapy in order to prevent and humanely treat adjustment difficulties.

Civilian psychiatrists lack the necessary insight into military problems and the daily contact with the combatant officers. It

should, therefore, be required that the Medical Corps engage psychiatrists for the medical service who are especially interested in working with the psychologic problems of military life and the adjustment problems of youths of military age. These medical specialists must also take on the *education* of the combatant officers in this indicated field of knowledge and at the same time conduct the necessary *control* of the young medical officers concerning prevention and treatment of psychiatric problems.

The question which arises in the end is how far we here in Norway, in a purely practical degree, have come with this newbroken ground. We can say that so far we have done the first rough spade digging. We have been fortunate in obtaining the authorities' conviction as to the necessity of military psychiatrists, and we have established—not yet filled—psychiatric posts within each military command area. We have now also received a grant for a military psychiatric outpatient department at the Oslo Military Hospital. It is too early to say how these institutions will function in practice. But I believe that the positive view and understanding of military psychiatric problems which have been shown by our O. C. Medical Corps, our chief medical officers, and our university professors will help us to solve them all in a satisfactory manner.

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A TUMOR SERVICE IN A MILITARY HOSPITAL

CLIFFORD F. STOREY, *Captain (MC) USN*
HERBERT VOLK, *Lieutenant Commander (MC) USNR*

TUMOR boards perform a useful purpose in the management of patients with malignant disease. The conference system of arriving at decisions in matters of therapy is of proved merit, with many advantages which far outweigh its possible disadvantages. Yet in spite of these obvious assets, a tumor board is not necessarily an immediate and inevitable success in a military hospital. Physicians in the armed services, no less than their civilian confreres, are rugged individualists. They are inherently, and justly, opposed to the practice of medicine "by committee." When confronted with a tumor board order with teeth in it, some look upon it as an invasion of their professional rights and as a disturbance of the normal physician-patient relationship. As a well-organized and properly run tumor board actually operates, however, these theoretically irritating factors are more apparent than real. It becomes obvious that consultation with a variety of specialists, even enforced consultation if you will, is a real asset in patient management. The teaching value of a lively tumor conference is immediately apparent to all who attend. The younger men frequently offer stimulating and helpful suggestions and they, in turn, profit by the discussion of the more experienced members of the conference.

A superior type of tumor service does not burst into full bloom overnight, nor does it, like Topsy, just grow. On the contrary, an efficient tumor service requires a concentrated effort on the part of the hospital staff and considerably in the way of physical facilities and personnel.

PREREQUISITES

There are several factors that are prerequisites for a vital tumor service. A service of this type obviously cannot be successful without the enthusiastic backing of the Command. The hospital order setting up the tumor service must be firm, clear, and without loopholes or equivocation. One hundred percent participation by the staff must be mandatory. Adequate space must be provided. There should be a suitable office for the executive

From U. S. Naval Hospital, Portsmouth, Va.

secretary and another for the clerical secretary. Adequate filing cabinets are required with an acceptable room for the storage of records in the tumor clinic. A cheerful and tastefully furnished waiting room for patients is highly desirable. At least two examining rooms are required. One should be equipped with a table suitable for abdominal, pelvic, and proctoscopic examinations, and all instruments and items of equipment necessary for examinations of this type, including, of course, various instruments for biopsies, should be available in the clinic. The second room should be equipped with a suitable chair and the necessary lights and instruments for ear, eye, nose, and throat examinations. The tumor board conference room should be sufficiently large to accommodate all staff medical officers. It should be equipped with adequate sound and projection equipment and multiple-tiered x-ray view boxes.

The personnel requirements are of the utmost importance. The executive secretary occupies a key position in the tumor service and the individual selected for this assignment should be chosen with the greatest care. This position requires a medical officer of tact, energy, enthusiasm, and a sincere interest in patients with malignant disease. He should be circumspect, diplomatic, and able to handle people well. It is a great asset if the executive secretary is trained in oncology and almost a necessity for him to be surgically trained. The clerical secretary should be of a high degree of intelligence, personable, discreet, a proficient typist, well versed in medical terminology, and able to take shorthand rapidly and accurately. A full-time graduate nurse is desirable in a busy tumor clinic but a Hospital Corps Wave makes an acceptable substitute where personnel shortages prevent the assignment of a nurse.

PATIENTS NOT SEGREGATED

It is to be emphasized that there is no "tumor ward" or wards in this hospital and the segregation of patients with malignant disease is distinctly *not* advocated. Each patient with a malignancy is retained on his or her parent service and treatment is actively directed by the medical officers on that service, guided, of course, by the recommendations of the tumor board. This avoids the adverse psychologic effects of congregating all patients with cancer together and permits each service to retain direct control of the care and treatment of its own patients.

When first organized, or converted from a "paper" organization which is accorded only lip service or token participation to a real and vital part of the hospital, a tumor service is apt to meet a degree of at least passive resistance from a few members of the staff. However, if the service is run on a high professional plane, its worth soon becomes apparent and those who initially resisted

the tumor service, in principle, become enthusiastic participants. This outcome is inevitable when it is clearly shown that a tumor board serves alike the best interests of patients with malignant disease and their responsible physicians.

Although a tumor service has long been in operation in this hospital, about one year ago a complete reorganization was effected in an effort to revitalize the service and to increase its scope and usefulness. A second objective was to meet the minimum requirements for the conduction of tumor clinics and cancer-detection centers which have been established by the Committee on Cancer of the American College of Surgeons.

Numerous difficulties were encountered during this period of change and much was learned by trial and error. It is believed, however, that now an organization has been established that functions efficiently and satisfies all of the requirements of the American College of Surgeons.

We believe that a description of the organization and operation of this service may be of use and interest to others who are either organizing an oncology service for the first time or contemplating the revision of an existing service in order to increase its efficiency.

The Board of Regents of the American College of Surgeons has established three official listings pertaining to oncology services:[1]

I. Cancer Hospitals

II. General Hospitals maintaining a Cancer Registry as the only form of a cancer program

III. General Hospitals maintaining a Cancer Registry, plus Cancer Clinical Activities, *i. e.:*

A. Cancer Consultation Service, or

B. Cancer Consultation and Treatment Service.

This hospital, which has been designated as an oncology center by the Chief of the Bureau of Medicine and Surgery of the United States Navy, is in class III B.

CANCER SERVICE

The services at this hospital for the diagnosis and treatment of cancer and allied diseases are the tumor board, the reviewing committee, cancer detection clinics, and the tumor clinic.

The Tumor Board. The tumor board is composed of the chief of surgery (as chairman), and the chiefs of the medical, laboratory, radiologic, and dependents services, the executive secretary of the tumor board, the chief of the specialized service of the

particular patient under consideration (when the patient is presented by a service whose chief is not a regular member of the tumor board), and a full-time civilian recording secretary.

The board has over-all cognizance of the treatment and disposition of all patients with neoplastic diseases in the hospital. Definitive therapy is not instituted prior to the consideration of the patient by the board or its reviewing committee. Medical officers have been directed to adhere strictly to the recommendations of the board. Should the presenting service disagree with the decision of the tumor board, the patient may be re-presented for further discussion.

Formal meetings of the tumor board are held at weekly intervals at a regular time and place. Emergency meetings of the entire board or its reviewing committee are held whenever a patient requires immediate consideration.

The Medical Officer in charge of each case is responsible for (1) informing the executive secretary of the board within 24 hours of the admission or detection of a patient with known or suspected malignant disease; (2) presenting the patient before the tumor board at its weekly conference or before its reviewing committee and for furnishing a summary of the case on a standard form to the executive secretary; (3) presenting to the board in follow-up those patients in whom a diagnosis has been established, definitive treatment completed, or where circumstances have arisen which make it advisable to consider a change in the therapeutic program; and (4) ensuring that each patient with a neoplastic disease, prior to discharge from this hospital or upon the completion of treatment, is sent to the tumor clinic office. At this time, the patient's files are checked and he is given specific instructions in the follow-up procedures.

Reviewing Committee. The reviewing committee functions as the executive committee of the tumor board. The membership may vary from case to case, but is always composed of at least three members of the tumor board and consists of the chief of the service from which the patient is presented, the executive secretary of the tumor clinic, and the chief of that particular service, who, because of his specialty training, may be expected to be of the greatest assistance in arriving at a proper decision concerning the patient under consideration. Additional members of the tumor board may serve on any given reviewing committee and frequently, because of the complicated problem to be considered, they are called upon to do so.

A reviewing committee may be convened by the executive secretary when any service has a patient to present whose problem is sufficiently urgent that it would be unwise to wait for formal pres-

entation before the tumor board. The reviewing committee also meets regularly once weekly, in addition to the emergency meetings mentioned in the preceding paragraph, at which time those patients are dealt with who were not selected, because of the routine nature of their problem, for presentation before the weekly tumor board conference.

Cancer-Detection Clinics. Chiefs of services are responsible for the operation of cancer-detection clinics in their respective departments and are required to maintain and operate their facilities in accordance with the standards outlined by the American College of Surgeons for cancer-detection centers. Patients found to have positive or suspicious findings are then referred to the tumor board.

Tumor Clinic. The executive secretary of the tumor clinic is a medical officer, preferably trained in oncology, who is appointed to his position by the commanding officer. He is a permanent member of the reviewing committee, the recorder of the tumor board, and the executive assistant to the chairman of the tumor board and, as such, is responsible for the preparation of the agenda for the weekly tumor board meeting. He supervises the maintenance of a record system, adhering to the requirements established by the Committee on Cancer of the American College of Surgeons, implements the follow-up service by which contact is maintained with patients with neoplastic diseases in accordance with the recommendations of the tumor board, and is available on request as a consultant to any of the services in arranging for or in carrying out special diagnostic or therapeutic procedures. In addition, he co-ordinates consultations which may be requested in accordance with the decisions of the tumor board. When a patient with a neoplastic disease is transferred from this hospital to another medical facility for treatment, it is his duty to see that adequate records, including roentgenograms, if appropriate, and microscopic slides of the lesion, are forwarded promptly to the activity to which the patient is transferred. He supervises the full-time civilian secretary who is charged with the responsibility of recording verbatim the entire discussion of each case presented at the formal board meetings and who does the routine clerical work in the clinic proper.

DISCUSSION

The weekly formal tumor board conference is primarily designed for teaching. A mimeographed program stating the patient's name, ward, diagnosis, and the name of the presenting physician, as well as the reason why the case is being presented (*i. e.*, for diagnosis, for treatment, for diagnosis and treatment, for follow-up, and for interest) is distributed to each medical officer two days prior to the meeting. This allows time for interested physi-

cians to examine the patient or review the literature on the subject prior to the presentation of the patient at the conference.

At the weekly session, the case history is presented by the patient's ward medical officer. Significant roentgen findings are reviewed by the radiologist. If a specimen for biopsy has been taken, the microscopic slides are projected on a screen and discussed by the pathologist. The patient is shown in person if the physical findings are of particular interest. The recommendations of the presenting service are then given by the medical officer who presents the case and the case is then open for free discussion. Comments, suggestions, and discussion from the floor are encouraged, after which the tumor board members discuss the case. Members of the tumor board may make alternative proposals as to the management of the patient in question, and following full consideration of all proposals, a decision is reached by a majority vote.

Interest has been high and the attendance at these conferences has been good. Lively differences of opinion have been expressed by members of the staff who were trained not only in different geographic but also in widely differing philosophical medical environments. However, in most instances the members of the tumor board have concurred with the recommendations of the presenting service.

For each patient who comes to the attention of the tumor board or the reviewing committee, an alphabetical index card, a follow-up control card, and a tumor board jacket are prepared. The tumor board jacket contains (1) the presenting medical officer's initial case summary, (2) a verbatim transcript of the tumor board discussion or a summary of the action taken by a reviewing committee, (3) the operation record if an operation was performed, (4) a complete record of any irradiation therapy that may have been given, (5) pathologic reports, (6) photographs and photomicrographs if any have been taken, (7) a copy of the hospital discharge summary, and (8) a copy of the necropsy protocol if the patient came to autopsy.

For each patient with a malignant disease, an American College of Surgeon's Cancer Summary Form is completed. The jackets of those patients who are found not to have a neoplastic disease are transferred to an inactive file.

An assortment of printed form letters has been prepared for obtaining follow-up data. A letter specifying the date and time when a patient is to report for follow-up examination is given to him when he leaves the hospital. Those patients who had been in this hospital prior to the inauguration of the present system are contacted by telephone or letter. Other form letters are sent to the patient's private physician or to the Veterans Administra-

tion—in any event, to the physician who is medically responsible for patients who are no longer in the service. The families of former patients who cannot be located are contacted for follow-up information. Replies to over 85 percent of our inquiries have been received, and a majority of these responses have contained pertinent information concerning the patient.

SUMMARY

The organization and operation of the cancer services in this hospital have been briefly reviewed. The organization and method of operation of the tumor service in this hospital does not represent original ideas on the part of the authors. It follows quite closely the recommendations of the American College of Surgeons as set forth in its various publications concerning the organization of tumor services and cancer-detection centers. Furthermore, a similar organization is in effect in other naval hospitals.

REFERENCE

1. Manual for Cancer Programs. Approved by the Committee on Cancer, American College of Surgeons, 1953. p. 3.

OSLER, THE PROLIFIC AUTHOR

Almost everything that Osler did seemed eventually to develop into an article for a medical journal, a chapter in a textbook, a lecture which was reported, or notes and comments in his daybooks. He would dash off from a visit to his relatives in Canada to see or make a post-mortem and find a rare disease that would subsequently be written up. He made full notes of such cases at Blockley as especially interested him, and then spent hours over the microscope with specimens obtained. Though it is evident that he worked with intense concentration, it is amazing that he was able to take such an active part in so many organizations and still find time for long holidays; and even on these, he got grist for his literary mill. As he said later, "Both pen and brain got a deal of practice in Philadelphia." And not only did he himself turn out work, but by his example and his contagious enthusiasm Osler stimulated those who came in contact with him to observe, record, and publish.

—WILLIAM WHITE, Ph. D.
in *International Record of Medicine and General Practice Clinics*, p. 511, Sept. 1954

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Clinicopathologic Conference

U. S. Naval Hospital, St. Albans, N. Y.*

DIARRHEA

Summary of Clinical History. A 33-year-old woman entered the hospital because of nausea, vomiting, and diarrhea. Since the age of 23 she had had remissions and exacerbations of psoriasis associated with arthritis. The skin and arthritic lesions almost completely disappeared in 1951 following the intramuscular administration of 0.5 gram of cortisone daily for 21 days. In February 1953, however, her symptoms recurred. Cortisone was again instituted and she was maintained on 100 to 150 mg. daily orally until 24 January 1954 with little improvement and mild fluctuations in her complaints. She then began to note nausea, emesis, and diarrhea. The diarrhea, accompanied by cramps, occurred soon after eating and the stools contained material similar to the ingested food. She had no fever. Because of the persistence of these complaints for five days she was admitted to the hospital on 29 January.

Physical Examination. Physical examination on admission revealed a blood pressure of 120/100 mm. Hg; temperature, 98.8°F.; pulse, 88; and respiration, 22. She weighed 111 pounds. There were extensive psoriasiform lesions over the entire body. Her extremities were markedly deformed and there was limited motion of most of her joints. Her abdomen was flat, nontender, and without palpable masses.

Laboratory Studies. On admission her red blood cell count was 3,760,000 per cu. mm.; hemoglobin, 10.5 grams per 100 ml.; and hematocrit, 36 percent. A white blood cell count showed a total of 5,400 cells per cu. mm. with a differential count of 63 percent neutrophils, 32 percent lymphocytes, 3 percent monocytes, and 2 percent eosinophils. A urinalysis revealed normal findings. The following day the blood urea nitrogen was 43 mg. per 100 ml.; chloride, 625 mg. per 100 ml.; and CO_2 combining power, 44.7 volumes percent.

*Capt. Harold G. Young (MC) USN, Commanding Officer. From the Medical Service, Capt. Lawrence E. Bach (MC) USN, Chief.

A barium enema and a gastrointestinal roentgenographic series revealed a gastrocolic fistula (fig. 1). An electrocardiogram showed a semivertical electrical axis without other abnormalities.

Figure 1. Roentgenogram of the gastrointestinal tract, showing the gastrocolic fistula.

The dosage of cortisone (25 mg. four times a day) was gradually reduced for four days and then discontinued on 4 February.

On 8 February her blood pressure dropped to 69/48 mm. Hg and she complained of being very thirsty. The blood urea nitrogen now was 31.7 mg. per 100 ml., but the chlorides rose to 790 mg. per 100 ml. The CO_2 combining power remained about the same at 42.8 volumes percent.

On 9 February an electrocardiogram showed a vertical electrical position and depression of the S-T segments in leads I, II, and III. The amplitude to T_1, T_2, and T_3 was decreased and T_{aVF} was depressed. T waves from V_2 through V_6 were less upright than in the previous reading. The S-T segments in V_5 and V_6 were slightly depressed and the Q-T interval (0.26 sec.) was increased over the previous reading. She continued to be hypotensive. On 11 February the blood urea nitrogen became elevated to 53.5 mg. per 100 ml.; the chlorides dropped to 755 mg. per 100 ml. and the CO_2 combining power, to 40.0 volumes per-

cent. The total plasma protein was 5.64 (albumin, 2.86; globulin, 2.78) grams per 100 ml.

Course in Hospital. On 13 February, following administration of 500 ml. of blood, the patient complained of epigastric, substernal, and head pain. She moaned continuously and appeared apathetic, answering questions only by saying "yes" or "no." Her blood pressure increased to 120/70 mm. Hg. She continued to have diarrheal stools that contained undigested food. The following day her speech was slurred, she had difficulty in swallowing, and became incontinent of urine and feces.

In preparation for surgical exploration, doses of cortisone (50 mg. twice a day, 50 mg. four times a day, and 75 mg. daily) were given on 13, 14, and 15 February, respectively. On 15 February a laparotomy was done and the gastrocolic fistula was repaired under general anesthesia. The patient's blood pressure had to be maintained by continuous intravenous infusion of levophed (brand of levarterenol bitartrate) during the operation. For two days following the operation she was semistuporous, irritable, and hypotensive. Continuous drip of levophed was given to maintain her blood pressure. Each day postoperatively, 50 mg. of cortisone were given intramuscularly four times a day. Twenty units of corticotropin (ACTH) were given intramuscularly on her second and third postoperative days. After a short clinical improvement on her third postoperative day, she died suddenly.

DISCUSSION

Doctor Leevy:* When this patient was first hospitalized she had a definite gastrocolic fistula, presumably due to perforation of a gastric ulcer into the colon. It is rather unusual to have a perforation into the colon as a complication of peptic ulcer whether cortisone has been used or not. In most instances this complication occurs in patients who have had a long-standing ulcer, or a gastroenterostomy as a result of which the colon has become adherent to the intestine. Occasionally neoplasms of the stomach are accompanied by a slow perforation. This case is unusual in that the perforation occurred without any antecedent knowledge of a peptic ulcer and without any previous operation.

In the differential diagnosis we should consider the possibility of an ulcer of the colon perforating into the stomach. There were no preceding intestinal symptoms to suggest ulcerative colitis. Arthritis in conjunction with intestinal disease occurs in Whipple's disease, but the patient's age and sex and the absence of steatorrhea are against this diagnosis.

*Lt. Carroll M. Leevy (MC) USNR, Medical Service.

Discontinuation of cortisone led to shock, which was accompanied by thirst, an elevated serum chloride, and azotemia. These changes occurred although the dose of cortisone was tapered off gradually, and they reflect the degree of adrenal depression which had developed over the preceding months when she had been receiving cortisone. Probably this was accompanied by atrophy of the adrenal gland, principally due to a loss of lipid in the zona glomerulosa and zona fasciculata. Atrophy of the adrenal cortex induced by adrenal steroids is the result of decreased endogenous excretion of corticotropin (ACTH). The hypotension and hemoconcentration are typical of adrenal insufficiency secondary to withdrawal of cortisone. However, one must consider the possibility that she had hemorrhage or a further perforation to account for these clinical features.

Thirst, which was present, may be attributed to decreased secretion of saliva due to dehydration or to an alteration of her serum sodium concentration and/or plasma volume. Probably both hypovolemia and hypernatremia contributed to this symptom. The low CO_2 combining power and the elevated serum chloride are of interest. Hyperchloremic acidosis, which is usually seen with ammonium chloride therapy or ureteral implants into the colon, could explain these findings. Whether the gastrocolic fistula produced a similar metabolic defect is not too clear. It seems more likely that the hyperchloremia was due to water dehydration, and the accompanying acidemia was related to accumulation of organic acids as a result of renal functional impairment. With prolonged cortisone therapy renal dysfunction may occasionally result from morphologic changes in the kidney similar to the intercapillary glomerulosclerosis described in diabetes by Kimmelstiel and Wilson; however, abnormal kidney function in this patient was probably due to adrenal insufficiency and shock.

The electrocardiographic picture appears to be typical of that seen in adrenal insufficiency. Adrenal insufficiency may be accompanied by depression of S-T segments and T-wave changes without demonstrable changes in the serum potassium or calcium. However, because of the gastrocolic fistula with probable deficiency of these cations due to poor food absorption, one cannot be sure that their deficiency did not contribute to the resulting electrocardiographic alterations. If the Q-T interval had been prolonged it would have suggested hypocalcemia, because potassium deficiency has no effect on this interval. Potassium deficiency increases the prominence of the U wave in addition to depressing the T waves and S-T segments.

After the patient's blood pressure returned to normal she had apathy and sensorial changes which probably were due to hormonal effects and which reflected the gravity of her illness. Refractoriness of hypotension to levophed and other vasopressor agents is typical of adrenal insufficiency.

At the time of operation she was critically ill. Patients with gastrocolic fistula are always poor surgical risks. The superimposition of adrenal insufficiency in such patients makes surgical intervention more hazardous. Patients receiving adrenal steroids at any time during a preceding period of from six to 12 months may require special therapy. These patients should be on a regimen similar to that prescribed for those having adrenalectomy for Cushing's disease, metastatic carcinoma, or hypertension.

A satisfactory program would consist of 200 mg. of cortisone 48 hours, 24 hours, and two hours preoperatively, and the intravenous administration of 10 mg. of hydrocortisone per hour during the operation and for four to six hours postoperatively. This should be followed by 50 mg. of cortisone every six hours on the first postoperative day, every eight hours on the second and third postoperative day, and then in gradually decreasing doses. When withdrawing ACTH or cortisone and its analogues it is essential to gradually reduce dosage. It may be helpful to give ACTH during the withdrawal period of cortisone. The possible development of acute adrenal insufficiency makes it desirable to give whole adrenal extract.

In summary, I believe that this patient's terminal illness was due to complications of adrenal steroid therapy. Biochemical alterations incident to adrenal insufficiency were probably responsible for the electrocardiographic, sensorial, and blood-pressure changes. The morphologic abnormalities which were encountered, such as the gastrocolic fistula and probable adrenal atrophy, were secondary to physiologic alterations which may occur when exogenous adrenal steroids are administered.

Doctor Becker:* Are the symptoms she had following the blood transfusion of any significance?

Doctor Leevy: I thought about the explanation for these symptoms and believed they could be a part of her cerebral changes related to adrenal insufficiency. They might represent the effects of suddenly increasing the plasma and/or blood volume with transfusions, or, finally, be due to transfusion reaction. It was quite difficult to determine from the protocol which, if any, of these mechanisms was responsible.

Doctor Flynn:** Would it have been wiser to use hydrocortisone intravenously or whole extracts of the adrenal?

Doctor Leevy: Yes, I think so. If one administers cortisone, it is presumably changed to hydrocortisone. In an acute situation it is better to give hydrocortisone. In patients with associated electrolyte depletion corticosterone would be preferable. Patients who have received

*Lt. (jg) George L. Becker, Jr. (MC) USNR, Intern.
**Lt. John E. Flynn (MC) USNR, Medical Service.

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cortisone over prolonged periods may have hepatic injury due to its catabolic effects, expressed anatomically by fat accumulation in the liver, and biochemically by a decreased excretion of urinary 17-ketosteroids. Liver damage may contribute to decreased response to cortisone. Where there is uncertainty, it is advisable to give hydrocortisone intravenously. In a patient with a gastrocolic fistula, in whom materials given orally may not be absorbed, it would be desirable to give all medications by muscle or vein.

Dr. Leevy's diagnosis:
Adrenal atrophy and insufficiency secondary to steroid therapy

PATHOLOGIC FINDINGS

Doctor Bach: We have with us today our visiting consultant in pathology, Doctor John M. Pearce,* who will tell us actually what was the trouble. We have been speculating up to now.

Doctor Pearce: Well, they are all very good speculations. At autopsy the patient was found to be an extremely emaciated person with considerable deformity and an apparently horrible skin condition, a dermatitis or rash. When the body was opened 1,000 ml. of clear amber fluid was found in each pleural cavity and 2,000 ml. in the peritoneal cavity. Such fluid collections may be explained on the basis of poorly functioning kidneys due to hypotension during a time in which she was getting a great deal of fluids intravenously just as a means of getting the levophed into her. She had no pulmonary or subcutaneous edema.

The heart weighed only 250 grams and, although the patient was a small woman, this weight is on the lower border of normal. Microscopic examination revealed a rather striking atrophy of the muscle fibers of the myocardium itself. Such atrophy probably was not a factor in her inability to maintain her blood pressure. In both lower lobes of the lungs there were fairly extensive infarctions, and there were thrombi in the distal inferior branches of the main lower branches of each pulmonary artery. The prosector was not able to find any thrombus in a vein which might be a source for emboli. Therefore, the conclusion was reached that they were not emboli but were local thrombi that occurred because of the poor state of the circulation and the patient's extreme illness; a static thrombosis in the dependent arteries.

The liver was large and weighed 2,550 grams. It was a very greasy and yellow liver. In other words, there was a marked infiltration of fat throughout the liver (fig. 2). Two possible explanations for the fatty liver are (1) cortisone causes a deposition of fat within the cytoplasm of the liver cells, and (2) the presence of a gastrocolic fistula

*Dr. John M. Pearce, Department of Surgical Pathology, Cornell University Medical College, New York, N. Y.

results in absence of food absorption. Because of the extensive fatty metamorphosis there was not enough intact liver parenchyma for necessary liver functions, although the organ as a gross organ was larger than normal. The gallbladder, curiously, contained a few milliliters of very watery mucous material. Apparently no bile was entering the gallbladder, but on the other hand there was no obstruction of the cystic duct. This white bile which one finds in hydrops of the gallbladder is, of course, as you all know, usually the result of an obstruction of the cystic duct. Here there was no obstruction. Presumably the

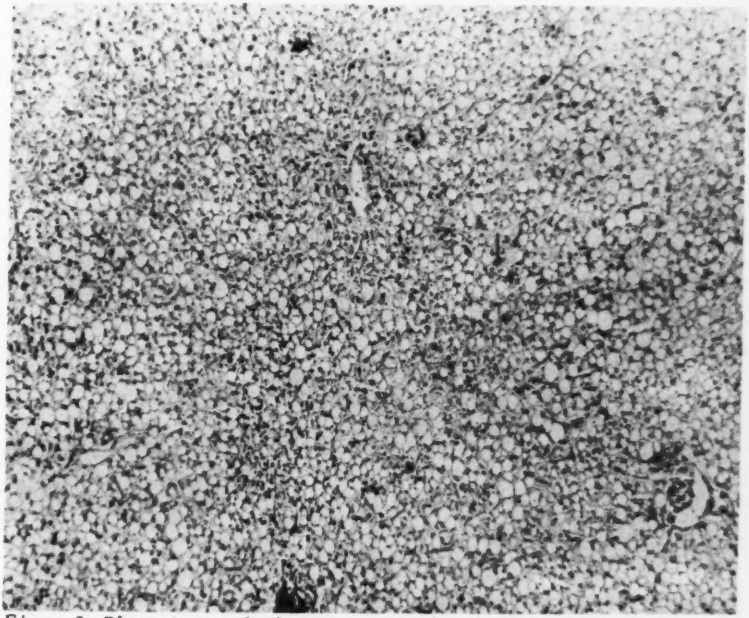

Figure 2. Photomicrograph showing extreme fatty metamorphosis of the liver. (× 75)

liver was the parent of the watery bile, but the patient was not jaundiced so it's a little hard to explain it by the argument that the liver was not putting out good bile. The pancreas was not unusual. The gastrointestinal tract showed the evidence of the repaired gastrocolic fistula. The fistula was on the greater curvature of the stomach, which is an unusual place for a peptic ulcer to occur. It was especially unusual because, as this stomach was further examined, another chronic peptic ulcer situated in the more usual spot on the lesser curvature a few centimeters above the pylorus was found. It measured 1½ cm. in diameter, was quite deep, and had a nice clean-cut edge. The patient apparently had no symptoms of the ulcer just as she had no symptoms of the fistula other than the mechanical transfer of stomach contents into the colon.

Now we come to the really important factor, the adrenal glands. The adrenal glands were markedly atrophic; the cortex measured well less than a millimeter (fig. 3). Curiously, they did have quite a bit of lipoid material. Atrophy of the adrenal glands due to cortisone therapy usually is associated with a diminished lipoid content. It is the lipid which contains the various steroids. In this case the cortical cells contained quite a bit of fat; however, the cortex as a whole was markedly narrowed.

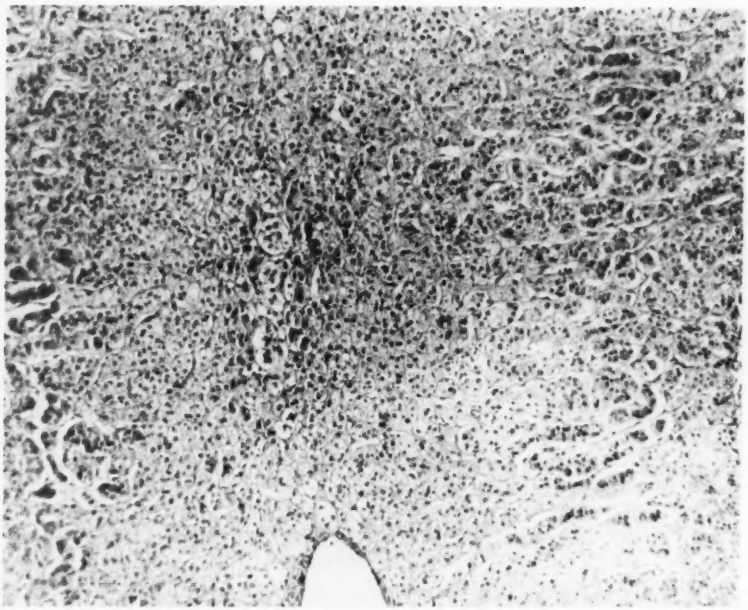

Figure 3. Photomicrograph showing adrenal cortical atrophy with some diminution of vacuolization. (× 75)

The pituitary was grossly normal but had histologic changes which are of great importance. In adrenal atrophy secondary to cortisone therapy, it is thought that the pituitary is suppressed so that it puts out no corticotropin. Without the stimulus of the corticotropin, atrophy of the adrenal occurs. The histologic changes in the pituitary consist of a loss of granularity of the cytoplasm of the basophilic cells. These cells tend to become hyalinized. In spite of the patient's psychotic symptoms the brain showed no gross abnormality, it was not edematous, and there was no lesion. The kidneys were normal in size. There was no renal lesion.

Doctor Grant:* What happens to the adrenal medulla in these patients?

*Capt. Roald N. Grant (MC) USN, Chief, Surgical Service.

Doctor Pearce: As far as I know it doesn't change very much.

Doctor Leevy: Would you call those Crooke's hyaline changes in pituitary?

Doctor Pearce: Yes.

Anatomic diagnoses:

Adrenal atrophy secondary to prolonged cortisone therapy
Fatty liver
Gastrocolic fistula, repaired
Peptic ulcer of stomach
Hyalinization of basophils of pituitary
Psoriasis
Static thromboses of inferior radicals of left and right pulmonary arteries.

Doctor Bach: This case was selected for presentation, not so much because of its value as a diagnostic problem, but for two very important additional reasons: (1) Because of its potentiality for provoking a general discussion of hormone therapy; and (2) because it would, we hoped, serve as a very forceful reminder to all that many of our present-day therapeutic measures—chemotherapy, antibiotics, sulfa drugs, hormones, et cetera—have the unhappy faculty of producing undesirable and sometimes disastrous results. These effects are not always predictable except as a possibility. However, and I am sure all of you will agree, we must always be conscious of these effects, and aware of the fact that we are many times taking a so-called "calculated risk" in their use and, equally as important, that these medications should be prescribed only in the presence of definite clinical indications.

CANCER OF THE PROSTATE

Any carcinoma (of the prostate) can be cured if found early enough and extirpated—the problem is to find it. Thus it is urged that more routine rectal examinations be done in men over 40 and more perineal punch biopsies be done in men under 70 having suspicious prostatic nodules exhibiting no evidence of metastasis or extension. Consequently it is also urged that more patients be considered as candidates for radical prostatectomy.

—DAVID W. CHASE, M. D.
in *Rocky Mountain Medical Journal*,
p. 978, Nov. 1954

CASE REPORTS

An Illuminating Case of Foreign Body in the Peritoneal Cavity

RUSSELL O. SETTLE, *Medical Director*
JOHN J. MENDILLO, *Senior Assistant Surgeon*
VICTOR W. GROISSER, *Senior Assistant Surgeon*

U. S. Public Health Service

A WIDE VARIETY of foreign bodies have been found in the peritoneal cavity,[1-3] including such diverse items as hemostats, hairpins, physician's eyeglasses, metal sounds, sponges, sewing needles, and chicken bones, to name but a few. Previous surgical procedures during which material is left behind, perforation through the bowel of swallowed articles, traumatic penetration of the abdominal wall, and perforation of the uterus in attempted abortions are the most frequently reported causes. Though numerous objects have been found in the rectum or sigmoid colon following introduction through the anal orifice, further progress into the abdominal cavity is uncommon. Most foreign bodies of the lower bowel are self reported and are removed via the anal orifice.

CASE REPORT

A 51-year-old, white, male, federal prisoner was brought to the emergency room of the hospital at 11:00 p. m. on 22 November 1953, complaining of severe lower abdominal and rectal pain and a mass protruding from the anus. He stated that he had been attacked five hours earlier by three assailants who forcibly inserted an object of some type into his rectum, resulting in severe pain and syncope. When he revived, he began having violent abdominal cramps which continued to increase in intensity. He attempted to relieve himself by moving his bowels, but "something came out which I could not get rid of." The distress finally became so intense that he called for help. He was first seen at the hospital by a civilian medical technician who notified the medical officer on duty, reporting a "severely ill patient, holding his abdomen in great distress, who appears, on examination, to have a piece of flesh hanging from his rectum half-way to his knees." The patient was immediately examined by a surgeon, who noted that the "piece of flesh" was a mass of viable greater omentum protruding nine inches beyond the anus. The pain was apparently excruciating. The patient's blood pressure was 120/80 mm. Hg; pulse, 90 per min.;

From United States Penitentiary, Leavenworth, Kans.

respiration, 20 per min.; and temperature, 100° F. The lower abdomen was boardlike, with exquisite rebound tenderness. Peristalsis was absent. He was wearing an artificial leg, having had a right lower leg amputation in the past. Except for the protruding omentum there were no external signs of injury and no other positive physical findings.

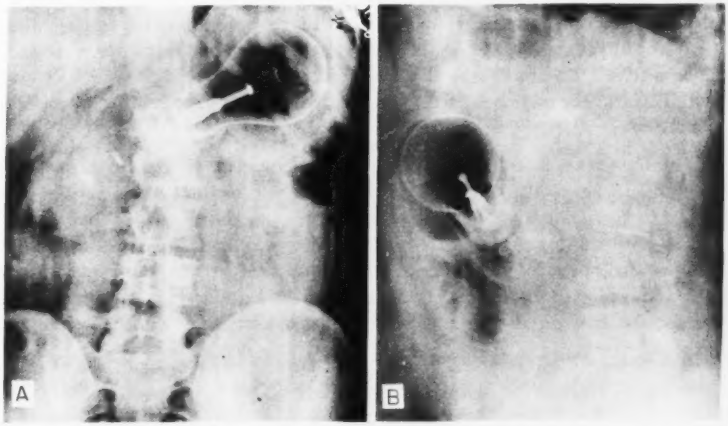

Figure 1. (A) Anteroposterior and (B) left lateral views of the abdomen, showing a light bulb surrounded by gas in the upper peritoneal cavity. The less dense extension with the two buttons, seen at the base of the bulb, was found at operation to consist of cardboard, cloth, and friction tape, forming a handle for the bulb.

The patient was immediately prepared for operation. At exploratory laparotomy two hours later the greater omentum was found prolapsed into the colon through a 6-cm. laceration in the anteromedial wall of the rectosigmoid, and the transverse colon drawn down tightly into the pelvis. The omentum was operatively divided where it entered the colon and the distal portion removed from below. The tear in the rectosigmoid was repaired uneventfully, but the remainder of the abdomen was explored manually with considerable difficulty due to fading of the spinal anesthetic. In spite of supplemental intravenous morphine, pentothal (brand of thiopental sodium) and curare, the abdomen was closed with difficulty.

On the second and third postoperative days the patient's condition was considered excellent. On the fifth postoperative day he complained of increasing abdominal pain and examination revealed signs of early intestinal obstruction. The temperature and leukocyte count rose; there was tenderness and a hard mass in the left upper quadrant. The first flat plate of the abdomen was taken at this time, and revealed to the amazement of all, a large light bulb lying in the upper abdomen (fig. 1, A and B). The patient was again taken to the operating room, the previous left rectus incision reopened, and the foreign body removed from

an abscess cavity located high under the transverse colon and the remaining portion of the omentum, adjacent to the inferior aspect of the mesocolon. On close scrutiny it was found to be an intact 60-watt electric light bulb, with the base encased in cardboard, forming a rounded handle into which torn pieces of underwear cloth were tightly packed to give the handle substance. Two buttons were attached to one fragment of cloth. This was all held together with black friction tape. No further lacerations of the gastrointestinal tract were found, and it seemed obvious that the bulb had entered the peritoneal cavity through the rectosigmoid tear but had been overlooked at the first laparotomy.

Thereafter the patient's condition deteriorated. Three weeks postoperatively, he again developed incomplete intestinal obstruction due to the formation of another abscess. This was drained at operation, but 28 hours later a fecal fistula developed, opening into the midjejunum. In spite of all efforts the fistula remained patent and the patient developed increasing malnutrition and inanition, which finally resulted in his death on 15 April 1954, about five months after the initial admission.

DISCUSSION

Several accounts of light bulbs entering the rectum and sigmoid colon through the anal orifice have previously appeared in the literature,[4-8] although to our knowledge this is the first report of a light bulb lying free in the abdominal cavity. Smooth objects of this type, drinking glasses, bottles, et cetera, are not uncommonly self-introduced for variously stated reasons, such as the relief of constipation or the replacement of prolapsing hemorrhoids, and similar cases are not unusual in the surgical practice of large general hospitals. Some patients will admit that the foreign body was employed for erotic gratification, though most give less self-incriminating explanations.

In view of this the probable mode of entry of the bulb into the peritoneal cavity of this patient is of some interest. Thorough investigation of the alleged assault indicated that the patient, a recidivistic criminal, had not been attacked, but rather had, in all likelihood, been using the rounded handle of the light bulb for anal masturbation. The five-hour wait before seeking medical aid, the absence of witnesses who could corroborate his story of the attack, the known frequency with which adult male prisoners practice anal erotic stimulation, the fact that an unbroken light bulb could hardly have been forcibly introduced past the anal sphincter without the patient's co-operation, and the manner in which the base of the bulb had been fashioned into a handle, led to the conclusion that the history given was a pure fabrication. It was assumed, therefore, that the bulb had been self-introduced accidentally, and that the patient under-

standably did not wish to reveal the true sequence of events. A short broom handle with a bent nail protruding from one end, discovered in the patient's cell following the incident, was evidently used by him in an attempt to retrieve it. His manipulations undoubtedly produced the laceration of the rectosigmoid through which the bulb slipped into the abdominal cavity and the omentum subsequently prolapsed.

Certainly this case is an excellent illustration of the importance of taking a roentgenogram of the abdomen of every patient presenting an acute abdominal emergency despite the apparently obvious diagnosis and the necessity of immediate laparotomy. Had a routine flat plate been ordered on the night of admission the true nature of the situation would have been immediately apparent, the surgeon would have been spared the embarrassment of overlooking such a large foreign body, and the patient's life might have been saved.

SUMMARY

A case of a foreign body in the abdomen is herewith presented, with the portal of entry for a 60-watt light bulb, found intact in the peritoneal cavity and originally missed at operation, being the anal orifice. It would appear that the bulb, the base of which had been fashioned into a handle by covering it with cloth, cardboard, and friction tape, was self-introduced into the rectum accidentally during an act of anal stimulation. It then gained entrance into the peritoneal cavity through a tear in the rectosigmoid which the patient made in an attempt to retrieve it. The importance of taking a preoperative flat plate in abdominal emergencies is again stressed.

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Pneumopericardium Associated With Delayed Cardiac Tamponade

ROBERT K. SPIRO, *Captain, MC, USAR*

SMALL WOUNDS of the thorax because of their seeming superficiality may retard a true evaluation of their intrathoracic effect for a considerable time. In this fashion, unsuspected pericardial tamponade may occur and death result needlessly.

CASE REPORT

An enlisted man was admitted to this hospital at 2345 hours on 15 April 1954 because of a chest wound. He had been evacuated through the usual medical chain, and his emergency medical tag indicated that his blood pressure was 90/60 mm. Hg when he had first been taken to his battalion aid station. Five hundred milliliters of dextran had been given intravenously. He arrived at this hospital one hour later with a blood pressure of 110/90 mm. Hg; pulse, 90; and respiration, 20. Physical examination on admission revealed a well-developed, well-nourished youth in mild distress with a superficial-appearing wound, four centimeters long, four centimeters left of the midsternal line in the fifth and sixth interspaces. The patient asserted that he had received this wound during a fight two hours earlier, when he had fallen on some glass. In view of the previous hypotension, transfusion of 500 ml. of blood was begun slowly.

Blood studies were within normal limits with the exception of the hemoglobin, which was 12.5 grams per 100 ml. Roentgenograms of the chest revealed pneumopericardium which was not noted at the time (fig. 1). Therapy consisted of wound cleansing, antibiotics, and secondary closure of the wound three days later. On 19 April the patient, who was convalescing well, was discharged to his unit on a light-duty and quarters status.

The patient was seen in the clinic on 24 April. He had no complaints, and had been walking up a gentle hill to mess since his discharge from the hospital. The wound was well healed and the sutures were removed.

At 2000 hours on 30 April he was again admitted to this hospital. He had become nauseated and had vomited several times during the 14 hours prior to his admission. He had spent the day lying on his cot,

From 45th Surgical Hospital, Korea. Capt. Spiro is now assigned to U. S. Army Hospital, Fort Dix, N. J.

feeling weak, and had experienced some epigastric pain. When he reported to his aid station he had a blood pressure of 80/0 mm. Hg and had received 500 ml. of dextran.

Figure 1. Roentgenogram taken 15 April 1954 showing pneumopericardium secondary to a stab wound of the chest. The gas in the pericardial sac can be seen.

Examination at this hospital revealed an acutely ill soldier. His blood pressure was 100/0 mm. Hg; pulse, 90; respiration, 20. The chest findings were within normal limits, but there was some rigidity in the epigastrium. The leukocyte count was 18,000 per cu. mm. with 76 percent polymorphonucleocytes; hemoglobin, 11.8 grams per 100 ml. The erythrocyte count was 4,200,000. On urinalysis specific gravity was 1.047. Roentgenograms showed cardiac enlargement. The abdomen and lungs appeared to be normal (fig. 2).

The patient was treated for acute pancreatitis. Five hundred milliliters of blood, 1,000 ml. of five percent dextrose in saline, penicillin, and streptomycin were given. Every eight hours 0.0004 gram of atropine sulfate was given. Vital signs were closely observed and nasogastric suction started. During the course of the night, the blood pressure

approximated 90/70, 112/96, and 96/82 mm. Hg; the pulse rate rose gradually to 100, and the respiration to 24.

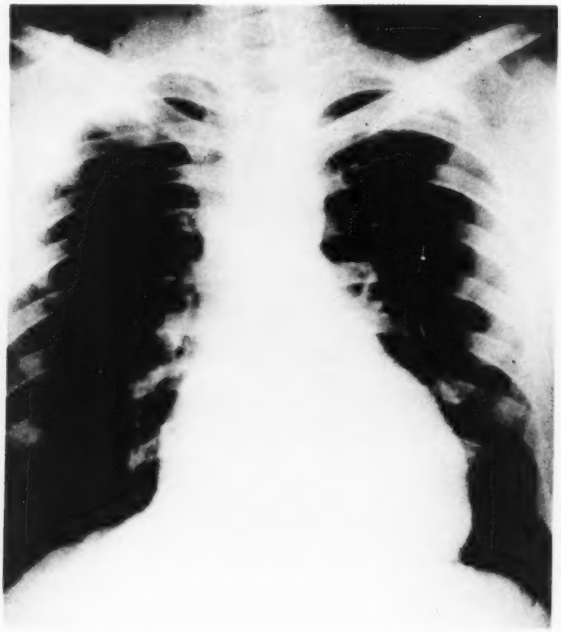

Figure 2. Roentgenogram taken 1 May 1954 showing globular heart shadow associated with pericardial effusion and cardiac tamponade.

The patient's head and neck were cyanotic in the morning. The neck veins were distended and the venous pressure was 60 mm. of water. A paradoxical pulse, enlarged cardiac outline, and feeble heart sounds were present. Respiration was 28; blood pressure, 92/80; pulse, 110. The patient was placed in orthopneic position and oxygen was administered by nasal catheter. The venous fluids and nasogastric suction were stopped. A diagnosis of cardiac tamponade, related to the chest wound sustained 16 days before was made.

At 1300 hours the patient was very cyanotic and distressed. Blood pressure was 84/0 mm. Hg; pulse, 122; respiration, 28. A pericardial tap was done and 360 ml. of serous fluid was removed under mild pressure. The fluid was sterile and contained only polymorphonucleocytes and lymphocytes. The patient improved immediately and the blood pressure returned to 114/80 mm. Hg and the pulse to 72.

Roentgenographic studies later revealed a loss of the globular contour and showed the heart size to be normal (fig. 3). The patient was

ambulated gradually. Electrocardiographic findings were normal. On 9 May the patient was discharged to duty.

Figure 3. Roentgenogram taken 14 May 1954. The cardiac silhouette is normal.

DISCUSSION

The case illustrates the treachery of a small wound of the thorax which produced little difficulty at the time of occurrence but was followed 16 days later by acute pericardial tamponade. It is impossible to determine completely the extent of a wound without exploration of it.

In retrospect, the initial roentgenogram showed pneumopericardium which might have been a clue to the true nature of the wound.

Perforating and penetrating wounds of the heart due to stabbing have become uncommon in military personnel since the advent of body armor. Stab wounds of the chest are still relatively common in the civilian population. Farringer and Carr[1] reported that more than 50 percent of the chest wounds in civilians were due to stabbings. They mentioned two patients who died because of delay in making the diagnosis of cardiac tamponade.

It is always desirable to explain the problem at hand and its effective solution, if achieved. It appears that this soldier had a wound which involved his pericardium. The serous surface of the pericardium responded to the injury by producing fluid which compressed the heart gradually, ultimately producing tamponade. The hypotensive state was due to inadequate cardiac output resulting from tamponade.

SUMMARY

A small chest wound, seemingly superficial, caused pneumopericardium in a patient associated with cardiac tamponade occurring 16 days after injury. A single aspiration of the pericardial sac was a lifesaving measure.

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THE PARADIGM OF FRUSTRATION

To me it appears a disservice to students if we encourage them in their search for pathognomonic signs, rather than have them view all aspects of a patient's problem as an entity; and it is particularly deplorable if through misplaced focus of attention we let them infer that a clinical problem can be appropriately described in a series of laboratory reports. To some students fresh from their courses in the medical sciences and fired with zeal to put clinical pediatrics on an accurate quantitative basis, the identification of Mongolian idiocy represents the paradigm of frustration—a situation in which no one sign is diagnostic and in which all the accessory aids one can bring to bear, including x-ray, carry less weight than does the impression gained on simple inspection. Here is the problem of the weight of evidence in a nutshell. If, then, students are to be coaxed to accord more judicious consideration to information which they may glean from history and from physical examination, we owe them guidance in those elusive areas of clinical probabilities and the influence of age on normal behavior and on behavior during illness, the pediatrician's special preserve.

—RUSTIN McINTOSH, M. D.
in *A. M. A. American Journal of Diseases of Children*, pp. 3-4, July 1954

Lithopedion

ROBERT E. L. NESBITT, Jr., *Captain, MC, USAR*

IN CERTAIN lower animals lithopedion formation in utero is relatively common, the fetus being retained in the uterus for a long time with subsequent deposition of lime salts. It is generally conceded, however, that lithopedion formation in man is confined to extra-uterine pregnancies in which part or all of the products of conception are extruded or initially implanted into the abdominal cavity where calcification takes place. Cave[1] established additional factors necessary for the formation of lithopedions: sluggish circulation, absence of infection, and a fetus advanced more than a three-month gestation.

Bainbridge[2] cited an interesting reference from Gould and Pyle pertaining to this subject: "Israel Spach, in an extensive gynecologic work, published in 1557, figures a lithopedion drawn *in situ* in the case of a woman with her belly laid open. He dedicated to this calcified fetus... the following curious epigram .... Roughly translated from the Latin, the epigram reads as follows: 'Deucalion cast stones behind him and thus fashioned our tender race from the hard marble. How comes it that nowadays, by a reversal of things, the tender body of a little babe has limbs nearer akin to stone?' "

The chemical changes responsible for the production of a lithopedion are not well understood. Calcium is deposited in dying or dead tissue without reference to the blood calcium. Fatty degeneration occurs initially; then hydrolyzation takes place and a fatty acid is liberated. The fatty acid is replaced by carbonic acid and phosphoric acid in the blood to form calcium carbonate and calcium phosphate. Wells[3] found that pieces of sterilized cartilage placed in the peritoneal cavity of a rabbit soon became calcified, having taken up lime from the fluid in which they bathed. He concluded that the process is a physical rather than a chemical one, the calcium and phosphate being absorbed by the degenerated tissue. MacCallum[4] believed that some local chemical process must be responsible for the precipitation of calcium in the dead materials exposed to the circulating fluids, as well as in bone. He stated that iron is practically always demonstrable in areas of calcification, but it is possible that it is merely absorbed

From U. S. Army Hospital, Bad Kreuznach, Germany. Dr. Nesbitt is now at Johns Hopkins Hospital, Baltimore, Md.

by the calcium salt or precipitated by phosphoric acid liberated in that position.

Schumann[5] categorized the final results of ectopic gestation as follows: resorption, mole formation, hematocele, suppuration, skeletonization, and adipocere and lithopedion formation.

Küchenmeister[6] proposed a practical method of classifying lithopedion specimens:

1. The lithokelyphos in which the membranes alone are calcified and form a hard shell surrounding the fetus. The fetus is not involved in the process of calcification.

2. The lithokelyphopedion in which both the membranes and the fetus are calcified.

3. The true lithopedion (stone child) in which the fetus is infiltrated with calcium salts and in which calcification of the fetal membranes is negligible. This type occurs when the fetus extrudes unattached into the abdominal cavity and the membranes are either left behind or tightly wrapped about the fetus.

Masson and Simon[7] preferred to use the term lithopedion for the entire group, and proposed the term lithotecnon for the true lithopedion.

The occurrence of lithopedion formation has been reported as from one to two percent of all extra-uterine pregnancies. Masson and Simon reported an incidence of 2.0 percent; Schumann, an incidence of 1.5 to 1.8 percent; and Anderson and others,[8] an incidence of 0.81 percent in 370 cases of extra-uterine pregnancy. The incidence has undoubtedly been reduced by the modern practice of early diagnosis and surgical intervention.

Since Venetiss first described this condition in 1595, there have been numerous cases reported in the literature. After adding three cases of their own, Anderson and associates in 1951 reported a total of 252 cases of authentic lithopedion formation in the world's literature. Since that time the following authors have reported cases: McClure and Epperson,[9] Schwarz,[10] Roberts,[11] Sordo Noriega,[12] and Herrera and Casimiro.[13] The present case brings the grand total to 258.

Lithopedions are usually seen in the cul-de-sac and pelvis as an incidental finding at operation. When laparotomy is necessitated by symptoms, the principal ones are usually dyspareunia and pressure. Masson and Simon stated that a lithopedion may not cause symptoms, but 60 percent of patients develop complaints attributable to the presence of the lithopedion after a quiescent period of from two to 50 years. The symptoms are usually mild at first, according to these authors, but may become more severe

and be attended by marked weakness and emaciation. In neglected cases, perforation into neighboring viscera or through the abdominal wall may occur.

Recently I managed a patient with lithopedion formation and incapacitating symptoms of 11 years' duration.

CASE REPORT

A 41-year-old woman, para 0, was admitted to this hospital on 28 April 1953 because of lower abdominal pain and 14 days of vaginal bleeding.

Eleven years previously she had had abdominal pain diagnosed as due to acute pelvic inflammatory disease. Since that time she had recurrent attacks of lower abdominal pain, fever, and yellow vaginal discharge. During the seven years prior to admission her activities were greatly limited because of abdominal pain, despite periodic pelvic diathermy, hot douches, and chemotherapeutic agents. In addition to lower abdominal pain, she complained of lower abdominal pressure, episodes of abdominal distention, and severe dyspareunia.

Her attack at the time of admission dated from 14 April, and from that time until admission she had daily vaginal bleeding that required from three to four pads per day. She also complained of constant, aching lower abdominal pain of a week's duration.

On admission she was obviously in pain but did not appear seriously ill. Her abdomen was obese, protuberant, and markedly tender over both lower quadrants. Pelvic examination revealed an orange-sized, cystic, right adnexal mass and a smaller, tender, cylindrical mass in the left adnexa. A roentgenogram of the abdomen revealed an ill-defined calcified mass in the pelvis.

She was treated with penicillin and streptomycin. Her general condition improved until the twelfth hospital day when she developed epigastric pain and nausea. She had hyperactive bowel sounds and some gaseous distention. She remained afebrile but a definite tachycardia was present. Her hemoglobin had fallen from 15.6 grams to 10.5 grams per 100 ml., probably due to the vaginal bleeding that had continued. The history of pelvic infection, the persistent pain despite chemotherapy, distention, amenorrhea, normal temperature, and drop in hemoglobin in association with a pelvic mass suggested the possibility of an old ruptured tubal pregnancy with hematoma formation.

On 13 May 1953 a laparotomy was performed under general anesthesia, and a 15-cm. cyst was found in the right ovary. Both tubes were enlarged, chronically infected, and adherent. There was a small cyst of the left ovary with a small parovarian cyst. A 12-cm., completely calcified fetus was densely adherent to the sigmoid and incased in dense fibrous tissue (fig. 1). The fetus was removed with great difficulty in

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the course of a subtotal hysterectomy and bilateral salpingo-oophorectomy. The uterus was normal except for adhesions and one small intramural myoma.

Figure 1. Lithopedion; mummified mass with only the fetal thorax and extremities identifiable.

The patient withstood the procedure well; her postoperative course was normal, and she was discharged in good condition on the tenth postoperative day. During a year's follow-up of this patient no abdominal or pelvic symptoms recurred.

SUMMARY

The present case of lithopedion formation brings the total of authentic reported cases in the world's literature to 258. The lithopedion developed over an 11-year period. The initial attack of acute abdominal pain was undoubtedly the rupture of an extrauterine pregnancy with extrusion of the unattached fetus into the abdominal cavity where it subsequently became calcified. The

subsequent periodic symptoms were due to recurrent attacks of pelvic inflammatory disease, secondary to the initial process. Menstrual disturbances were secondary to functional cysts of the ovaries and infection.

In follow-up examinations of the patient for one year there was no recurrence of pelvic or abdominal symptoms.

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OINTMENTS IN THE DERMATOSES

Ointments are useful in the therapy of chronic dermatoses, but frequently make acute dermatoses worse. Often a patient will tell his physician that the ointment that he applied to his poison ivy made him worse, or that the salve that he purchased or which was recommended to him burned him and caused his eruption to spread. This is the most common complaint heard in a dermatologist's office. Ointments are mixtures of active ingredients in a grease or in a grease-like substance. They are useful in some cases of psoriasis, in scabies, and in a few other skin conditions, but are in reality rarely necessary.

—GEORGE E. MORRIS, M. D.
in *GP*, p. 40, July 1954

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Congenital Arteriovenous Aneurysm of the Retina

JOHN F. DIAS, Jr., M. D.

IN 1951 Rundles and Falls,[1] in their review of the literature, summarized the 31 cases of congenital arteriovenous aneurysm of the retina which had been reported up to that time, and added three cases of their own. In 1954 Riffenburgh[2] added another case. The case presented below is, in my opinion, an example of an arteriovenous aneurysm of the retina which is a true congenital anomaly.

CASE REPORT

On 1 March 1946 a 29-year-old staff sergeant was admitted to this hospital with a complaint of frequent syncope during the previous 14 months. The patient stated that vision in his left eye had been poor since infancy. He said that his father, though living and well, had developed poor vision in the left eye at the age of 48 from "looking at hot steel" in his work as a blacksmith, and in 1937 his vision was (left) 20/40 with glasses. There was no other family history of eye disease or congenital anomaly.

The general physical examination was entirely normal except that pressure on either carotid sinus brought on syncope. Roentgenograms of the skull showed no pathologic condition. The general course was uneventful, and no treatment was given.

On the medical service it was concluded that there was insufficient evidence to make the diagnosis of a carotid sinus syndrome; the recurrent syncope was considered the probable result of hypotension due to postural effect, and possibly due to elements of anxiety and asthenia in the patient as a result of prolonged hard work under tension.

Because of the history of poor vision in the left eye he was referred to the eye clinic and was seen in consultation on 11 March 1946. His vision was: right eye, 20/15; left eye, faulty light perception. The external examination was normal; both pupils reacted to light. The consensual reflex was present. Examination of the media and fundi revealed normal appearance of the right eye. A large tortuous vessel which could be followed

From Murphy Army Hospital, Waltham, Mass. Dr. Dias is now at 227 Union St., New Bedford, Mass.

from the disk around the macular region and back to the disk was observed in the left eye. The first portion was thick-walled and lighter in color than the second part, which was of arterial hue but deeper in tint; the two portions were obviously artery and vein connected end to end. The second portion pulsated

Figure 1. Drawing of the left fundus of the patient, showing (1) the dilated artery-vein and variations in its diameter; (2) an area of pigmented macular(?) degeneration; (3) poor definition of the disk; (4) the retinal vessels, somewhat smaller than normal and hidden in many places by thickening of the retinal stroma; and (5) the area presented when the patient looks at the ophthalmoscopic light.

when pressure was applied to the globe; the first did not. There was an area of degeneration at the macular region. A representation of the condition as seen with the ophthalmoscope is shown in figure 1. An attempt was made to locate a retinal camera with the idea of photographing the lesion, but none could be found until after the patient was discharged and could no longer be located.

COMMENT

At the time this patient was examined I made a search of the literature and was much impressed by the monograph on this condition by Wyburn-Mason.[3] I was influenced to delay reporting this case by this author's opinion that most of the reported cases were probably early cases of von Hippel's disease and would have been so revealed by a follow-up of several years. Unfortunately, because I have been unable to communicate with this patient, a follow-up is impossible.

In my opinion, this was a true congenital anomaly in that an artery and a vein became connected without a capillary bed between, and gradually enlarged to the size observed. The lighter color of the superior portion of the loop, I believe, was due to the presence of thicker muscularis, which also prevented collapse of the loop when intraocular tension was increased by pressure on the globe. The inferior portion, filled with arterial blood, had a deeper tint because of its thinner wall, which allowed pulsation to show when outside pressure was applied.

Of all the cases illustrated in the literature, the case of Rentz[4] most resembled the one reported here. The condition of Stokes'[5] patient was also similar, although the vessel had a smaller loop. Both these patients, however, had good vision.

I believe that this condition of arteriovenous aneurysm of the retina is more common than is ordinarily supposed. Undoubtedly many cases in which enlargement of the main vessels is slight are missed in a hasty examination of the fundus; others may be observed but not reported.

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It is necessary to be reminded periodically that the practice of medicine does not consist entirely of miracles, magic bullets, or nuclear physics. Gowers' observation is still true. He said, "If every drug in the world were abolished, a physician would still be a useful member of society."

—ROBERT J. NEEDLES, M. D.
in *Journal of American Medical Association*
p. 586, Oct. 9, 1954

PROMOTIONS OF OFFICERS

The following officers of the military medical services on active duty in the Navy and Air Force have recently received temporary promotions to the rank indicated:

Medical Corps

Robert H. Adams, *Maj., USAF*
Wallace M. Adye, Jr., *Capt., USAF*
William Aldis, *Lt. Comdr., USN*
James F. Alison, Jr., *Capt., USAF*
Newton W. Allebach, *Lt. Comdr., USN*
John J. Allen, *Capt., USAF*
Claude T. Anderson, *Capt., USAF*
Donald C. Anderson, *Lt. Comdr., USN*
Donald B. Baker, *Capt., USAF*
Americo L. Barreiro, *Lt. Comdr., USN*
Billy J. Bauman, *Capt., USAF*
John M. Bell, *Lt. Comdr., USN*
Charles C. Benton, *Lt. Comdr., USN*
Henry C. Benzenberg, Jr., *Lt. Comdr., USN*
Eugene Berger, *Lt. Comdr., USN*
Harry A. Bliss, *Lt. Comdr., USN*
Henry H. Boyter, *Lt. Comdr., USN*
Franklin T. Brayer, *Lt. Comdr., USN*
Richard B. Bridenbaugh, *Lt. Comdr., USN*
Edward J. Brown, *Capt., USAF*
Robert R. Burwell, *Capt., USAF*
John D. Casey, *Lt. Comdr., USN*
Donald J. Cluskey, *Lt. Comdr., USN*
Granville C. Coggs, *Capt., USAF*
James W. Correll, *Lt. Comdr., USN*
Wyndon D. Cranney, *Lt. Comdr., USN*
George F. Crikelair, *Lt. Comdr., USN*
John F. Curran, Jr., *Lt. Comdr., USN*
Richard C. Daarud, *Capt., USAF*
Hershel A. Danemann, *Capt., USAF*
Robert M. Dean, *Capt., USAF*
Pierino F. Delia, *Lt. Comdr., USN*
Walter W. Dewey, *Maj., USAF*
Alonz M. Donnell, Jr., *Maj., USAF*
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Charles M. Earley, Jr., *Capt., USAF*
Earl H. Eaton, Jr., *Lt. Comdr., USN*
Marcus E. Eichman, Jr., *Lt. Comdr., USN*
Laverne S. Erickson, *Capt., USAF*
Montgome N. Estridge, *Lt. Comdr., USN*
Halvdan G. K. Faaland, *Comdr., USN*
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Curzon C. Ferris, Jr., *Maj., USAF*
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Macroy Gasque, Jr., *Lt. Comdr., USN*
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Bernard E. Gorton, *Capt., USAF*
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Abraham A. Mekelburg, *Lt. Comdr., USN*
Karl F. Menk, *Lt. Comdr., USN*
Dexter Meyer, Jr., *Lt. Comdr., USN*
Max I. Michels, *Capt., USAF*
David R. Millard, Jr., *Lt. Comdr., USN*
William J. Mogabgab, *Lt. Comdr., USN*
Herman R. Moore, Jr., *Lt. Comdr., USN*
Richard K. Morgan, *Lt. Comdr., USN*
John P. Murray, *Capt., USAF*
Simon D. Murray, *Lt. Comdr., USN*
Thomas M. Ohern, *Capt., USAF*
Richard W. Olmsted, *Lt. Comdr., USN*
Calvin R. Openshaw, *Lt. Comdr., USN*
Joseph Padovano, *Lt. Comdr., USN*
Harold P. Pariser, *Lt. Comdr., USN*
Anthony J. Parisi, *Lt. Comdr., USN*
Roy W. Parker, *Lt. Comdr., USN*
John K. Pearson, *Capt., USAF*
James H. A. Peck, Jr., *Lt. Comdr., USN*
Elmer D. Peffly, *Capt., USAF*
Arthur Penton, Jr., *Capt., USAF*
Maurice F. Perll, *Lt. Comdr., USN*
Harvey H. Perman, *Lt. Comdr., USN*
Paul C. Peters, *Capt., USAF*
William E. Peterson, *Capt., USAF*
Otis M. Pickett, *Lt. Comdr., USN*
Pearl H. Pierson, *Capt., USAF*
John D. Pinto, *Lt. Comdr., USN*
John B. Plauche, *Lt. Comdr., USN*
John E. Pulaski, *Lt. Comdr., USN*
Alan M. Robertson, *Lt. Comdr., USN*
Charles P. Root, Jr., *Comdr., USN*
Solomon Rosenberg, *Lt. Comdr., USN*
David B. Rulon, *Lt. Comdr., USN*
Donald C. Samson, *Lt. Comdr., USN*
Eugene W. Sausser, *Lt. Comdr., USN*
Anthony T. Scafa, *Lt. Comdr., USN*
Jenaro G. Scarano, *Lt. Comdr., USN*
Peritz Schelnberg, *Lt. Comdr., USN*
Arthur L. Scherbel, *Lt. Comdr., USN*
Paul R. Schloerb, *Lt. Comdr., USN*
Bland H. Schwarting, *Maj., USAF*
Robert G. Schultz, *Lt. Comdr., USN*
Lyman J. Scripter, *Maj., USAF*
Herman S. Shapiro, *Lt. Comdr., USN*
John E. Sharta, Jr., *Lt. Comdr., USN*
John H. Shelley, *Lt. Comdr., USN*
James R. Silber, *Capt., USAF*
Robley D. Smith, III, *Capt., USAF*
Franklyn C. Spiro, *Maj., USAF*
Norman W. Staker, *Lt. Comdr., USN*
Pelha P. Staples, Jr., *Maj., USAF*
Arthur Stiffel, *Lt. Comdr., USN*
Max A. Stoner, *Capt., USAF*
Jack P. Strong, *Capt., USAF*
Alexander C. Stuart, *Capt., USAF*
George C. Sutton, *Lt. Comdr., USN*
Melvin R. Swafford, *Capt., USAF*
Daniel M. Thomas, *Lt. Comdr., USN*
George P. Thomas, Jr., *Lt. Comdr., USN*
Walton D. Thomas, *Lt. Comdr., USN*
Charles R. Thomson, *Lt. Comdr., USN*
James H. Thorpe, *Capt., USAF*
Robert D. Towne, *Capt., USAF*
Bernard Tumarkin, *Lt. Comdr., USN*
Stanley Turkel, *Lt. Comdr., USN*
Alston C. Twiss, *Lt. Comdr., USN*
James R. Upp, *Capt., USAF*
Herbert Volk, *Lt. Comdr., USN*
Thomas E. Vonder Harr, *Capt., USAF*
Richard L. Voorhees, *Capt., USAF*
John W. Wahl, *Lt. Comdr., USN*
Julian E. Ward, *Capt., USAF*
Allen S. Weed, *Maj., USAF*
Byron V. Whitney, *Lt. Comdr., USN*
Francis P. A. Williams, *Lt. Comdr., USN*
Gerald E. Wineinger, *Comdr., USN*
Calvin W. Woodruff, *Lt. Comdr., USN*
Millington O. Young, *Lt. Comdr., USN*
Charles M. I. Zaigles, *Lt. Comdr., USN*
Roy W. Zimmer, Jr., *Capt., USAF*

Dental Corps

Thad L. Andrews, *Capt., USAF*
Edward D. Ayres, *Capt., USAF*
Frank E. Barringer, *Capt., USAF*
Bertram R. Bohn, *Capt., USAF*
Warren J. Boutreis, *Lt. Comdr., USN*
Israel Cooper, *Lt. Comdr., USN*
Edward E. Davis, *Maj., USAF*
Grady D. Donathan, Jr., *Lt. Comdr., USN*
Raymond C. Duke, *Capt., USAF*
Donald F. Foit, *Lt. Comdr., USN*

Dental Corps—Continued

Paul Foreman, *Lt. Comdr., USN*
Irving S. Glasner, *Lt. Comdr., USN*
David Green, *Lt. Comdr., USN*
Joseph G. Hancock, *Lt. Comdr., USN*
Edward G. Hutton, *Lt. Comdr., USN*
George W. Johnson, *Lt. Comdr., USN*
Frank M. Lapeyrolerie, *Capt., USAF*
Gustave Lasoff, *Lt. Comdr., USN*
John L. Lucas, *Capt., USAF*
Van D. McCool, *Lt. Comdr., USN*
Harold E. Milkey, *Capt., USAF*
Max B. Musicer, *Lt. Comdr., USN*
Fred J. Novak, *Capt., USAF*
William C. O'Rielly, Jr., *Capt., USAF*
Jack A. Rampton, *Lt. Comdr., USN*
Edward W. Roy, *Maj., USAF*
John R. Saunders, *Capt., USAF*
Aaron Schlecter, *Lt. Comdr., USN*
John K. Schroeder, *Lt. Comdr., USN*
Charles T. Schwatka, Jr., *Maj., USAF*
Richard A. Smith, *Maj., USAF*
Charles P. Thom, *Lt. Comdr., USN*
Gerald S. Wank, *Capt., USAF*
Charles L. Williams, *Lt. Comdr., USN*

Medical Service Corps

Albert L. Andersen, *Lt. Comdr., USN*
Gerald J. Armatis, *Capt., USAF*
Carl P. Calhoun, *Lt. Comdr., USN*
Pierce F. Carney, *Maj., USAF*
William H. Coffman, *Maj., USAF*
Charles M. Daniels, *Maj., USAF*
Malcolm W. Day, *Capt., USAF*
Raymond C. Dickinson, *Capt., USAF*
Edward Dominguez, *Lt. Comdr., USN*
James R. Gamble, Jr., *Capt., USAF*
Keith C. Gillette, *Capt., USAF*
Edmund H. Gleason, *Lt. Comdr., USN*
John L. Green, *Maj., USAF*
David F. Hersey, *Capt., USAF*
Wayne B. Hewitt, *Lt. Comdr., USN*
James W. Kinder, *Lt. Comdr., USN*
Jasper Lapresto, Jr., *Capt., USAF*
Charlie W. Lee, *Lt. Comdr., USN*
Ernest W. Littleton, *Capt., USAF*
Samuel C. Marcus, *Lt. Comdr., USN*
Loren E. McClung, *1st Lt., USAF*
Richard E. McKenzie, *Capt., USAF*
John S. McNeil, *1st Lt., USAF*
Philip A. Palumbo, *Capt., USAF*
Clair L. Patterson, *Lt. Comdr., USN*
John H. Patrick, Jr., *Maj., USAF*
Marvin C. Reed, *Capt., USAF*
Charlie A. Rice, *Lt. Comdr., USN*
Robert F. Rigg, *Lt. Comdr., USN*
Robert J. Roftis, *Maj., USAF*
Jean D. Rogers, *Capt., USAF*
Marvin L. Scott, *Capt., USAF*
Ruth C. Shatterly, *Capt., USAF*
Malcolm F. Slayter, *Maj., USAF*
William A. Staub, *Capt., USAF*
Charles J. Stefka, *Maj., USAF*
Leldon B. Thomason, *Capt., USAF*
James E. Thompson, *Lt. Comdr., USN*
Domenic A. Vavala, *1st Lt., USAF*
Charles R. Wannemacher, *Lt. Comdr., USN*
Joe D. Welch, *Capt., USAF*
Chester D. Worthen, *Lt. Comdr., USN*

Nurse Corps

Mary E. Aldhizer, *Capt., USAF*
Virginia M. Alena, *Capt., USAF*
Rita A. Angers, *1st Lt., USAF*
Barbara W. Atkins, *Capt., USAF*
Rita J. Ball, *Capt., USAF*
Rachel Bliek, *Capt., USAF*
Dorothy A. Bremer, *Capt., USAF*
Ella M. David, *Capt., USAF*
Eileen Farrell, *Capt., USAF*
Doris J. Fritts, *Capt., USAF*
Rosemary Garbett, *Capt., USAF*
Dorothy B. Garrison, *Capt., USAF*
Norma H. Kolodziejczyk, *1st Lt., USAF*
Theodora F. Larimore, *Capt., USAF*
Ileen S. Lewis, *1st Lt., USAF*
Marci L. Livingston, *Capt., USAF*
Suzanne E. Luchuck, *Maj., USAF*
Dorothy E. McHugh, *Capt., USAF*
Carol B. Meyers, *1st Lt., USAF*
Lilly A. Nakatani, *1st Lt., USAF*
Rita O'Hara, *Capt., USAF*
Clara Petts, *Capt., USAF*
Sarah J. Rafferty, *1st Lt., USAF*
Jean H. Richardson, *Capt., USAF*
Herminia D. Rogers, *Capt., USAF*
Regina M. Schafer, *Capt., USAF*
Ruth F. Schneider, *Capt., USAF*
Mildred F. Schooley, *Capt., USAF*
Dorothy L. Shields, *Capt., USAF*
Ruby L. Thacker, *Capt., USAF*
Sarah P. Wells, *Capt., USAF*
Mary E. White, *Capt., USAF*
Annie V. Williams, *Capt., USAF*
Helen S. Willman, *Capt., USAF*

OFFICERS OF 25 NATIONS, INCLUDING 13 SURGEONS GENERAL, VISIT USAF BASES

The surgeons general of 13 allied air forces and 14 other foreign military medical officers, representing 25 countries, were the official guests of Major General Dan C. Ogle, USAF (MC), Surgeon General, U. S. Air Force, on a visit in March to Air Force bases in Alabama, Texas, and Ohio following the twenty-sixth annual meeting of the Aero Medical Association in Washington, D. C.

The surgeons general of 14 air forces were photographed at the U. S. Air Force School of Aviation Medicine on 26 March 1955. Front row, left to right: Brig. Gen. Miguel Lafont, Spain; Brig. Gen. A. M. Geissa, Egypt; Maj. Gen. P. Bergeret, France; Maj. Gen. Dan C. Ogle, United States; Maj. Gen. Hsu-chu Li, Republic of China; Brig. Gen. Johan E. Brouwer, Netherlands. Rear row, left to right: Capt. Jawdat Adi, Syria; Maj. Severiano Cendales, Colombia; Air Vice Commodore Soebardi Hardjoloekito, Indonesia; Gp. Capt. E. A. R. Ardesbir, India; Maj. R. H. Bathgate-Johnston, Rhodesia and Nyasaland; Col. T. Y. Roschier, Finland; Col. Pyeng-Nai Pak, Republic of Korea; Lt. Col. Pelagio G. Potenciano, Philippines.

Traveling by military aircraft, the group inspected the medical training and research facilities at the Gunter Branch of the School of Aviation Medicine, Gunter Air Force Base, Ala., the U. S. Air Force School of Aviation Medicine, Randolph Air Force Base, Tex., and the Aero Medical Laboratory, Wright-Patterson Air Force Base, Ohio.

A MESSAGE FROM THE A. M. A.

The May issue of this *Journal* carried a brief review of the report made by the Hoover Commission on Federal Medical Services as it was applicable to our veteran population. We further discussed the need for conservation of this medical manpower and resources wherever appropriate and suggested that such economies could be used to increase civil defense preparedness.

As to the findings of the task force of the Hoover Commission on Federal Medical Services in the military, the report noted that the Department of Defense is in a declining economy in the field of medical care. In spite of this, however, the report leaves no doubt that the Department of Defense comes in for its share of lack of coordination and the huge wastes in Federal medical services.

A summary of three of the five metropolitan areas surveyed with respect to Federal hospital services showed a very high number of unused beds for the Armed Forces. For example, in the San Francisco area there were 11 Department of Defense hospitals with 7,806 beds, of which 4,681 were unused. The New York area military bed capacity was 3,238 but 2,009 were unoccupied. In the Norfolk area, with 3,051 hospital beds, there were 1,458 unused. By services, the Army had 48 percent of its beds occupied in the San Francisco area while the Navy and Air Force each had only 38 percent occupancy. In the New York area the Army had a 43 percent occupancy; the Navy, 37 percent; and the Air Force, 48 percent occupancy. At the Norfolk area the Navy had a 70 percent hospital bed occupancy, but the Army and Air Force each showed only 20 percent occupancy of their beds.

Turning to the hospital construction program of the military services, the survey indicated further lack of coordination and waste. Of 106,403 beds in 1952, only 57,514 were occupied. In the same year expenditures for hospital construction amounted to $11,822,000. In 1953, military hospital beds totaled 102,280 with only 49,520 occupied; nevertheless hospital construction was $6,071,000. In 1954, there were 91,097 beds with 39,628 in use, and construction reached $49,612,000. Estimates for 1955 are: hospital construction, $62,227,000; total of 93,152 beds with 58,899 unused.

From the Council on National Defense of the American Medical Association. The views and opinions expressed are not necessarily those of the Department of Defense. —*Editor.*

Such waste is not limited to money alone. The technical personnel required to operate these partly filled facilities is a drain on the medical and health technicians much needed by our civilian population. If it be argued that these excessive practices are needed against war emergency, can it not be answered that had these funds been used to relieve the civilian situation, the civilian hospitals would equally be available for war emergency.

A most interesting and revealing item of the report concerns the length of patient stay in Federal hospitals. For an appendectomy in a civilian hospital the average length of stay was found to be 7.8 days, while in an army hospital active-duty personnel spent 19.6 days and others, excluding veterans, spent 9.9 days for an appendectomy. In a naval hospital the time was 20.3 days for active-duty personnel and 9.6 days for others, excluding veterans. Civilians in a general hospital spent but 1.4 days for a tonsillectomy, but in an army hospital active-duty personnel spent 16.1 days and others 3.0 days, while at a naval hospital the average was 13.3 days for active-duty personnel and 2.5 days for others. For hemorrhoidectomy and herniotomy (inguinal) a similar sizable increase was indicated by the military in comparison with civilian hospitals.*

"Military personnel on active duty receive relatively large amounts of hospital service, an average of 8 days a year (exclusive of battle casualties), as compared to 1 day a year in general hospitals for the United States population," the report stated.

Medical care given to dependents of service personnel is large and has grown enormously in recent years. On an average day in 1953 they occupied 6,300 beds in military hospitals and received 23,000 outpatient treatments. In 1948, some 42,000 babies were born in military hospitals in the United States. In 1953, the number was over 145,000.

The report recommended that the medical and hospital services of the three military services be modified into a much more closely coordinated pattern in which one service would be given responsibility for medical care in each region of the United States. Within this broad recommendation several specific recommendations were made. Armed services training programs for medical officers were also recommended for strengthening.

*The figures given in this paragraph, for patients discharged between January and August 1948, are from a table published in the first report of the Hoover Commission on March 16, 1949.—*Editor.*

COMMENT ON A. M. A. MESSAGE

The preceding article, "A Message From the A. M. A.," was submitted by the Secretary of the Council on National Defense of the American Medical Association and is published at the request of the Assistant Secretary of Defense (Health and Medical). A message from the A. M. A. has been printed in the *Journal* each month since January 1954. This was done to facilitate the communication of information from organized medicine to the physician in uniform.

In the present instance, special comment appears to be necessary. The current communication largely consists of paraphrases or direct quotations from the report on Federal Medical Services made by the so-called "Hoover Commission" in February 1955 (incorrectly attributed to the "task force" report). As such, and because of the fragmentary reporting of items touched upon, it tends to perpetuate and actually further exaggerate unsubstantiated charges of lack of coordination, waste, excessive personnel, and excessive bed capacity in the military services. These charges are made in broad, general terms, while illustrations offered to substantiate them either do not accord with the facts or rest on very serious misinterpretations of the available facts.

In paragraph 2 the message states that there are "huge wastes in Federal medical services." However, repeated comparisons of governmental with private hospital programs have demonstrated that the navy medical care program for example, utilizes less personnel and achieves a lower cost per patient day than any other comparable program, while maintaining the highest quality standards. During fiscal year 1954, the cost per patient day in naval hospitals was $14.84. This compares most favorably with published costs in private hospitals ranging from $18.69 to $27.55 per patient day. The all-inclusive charge of huge waste is not justified.

Paragraph 3 recites statistics designed to demonstrate "a very high number of unused beds for the Armed Forces," but fails to mention that a large proportion of the "unused beds" are strictly in moth-ball status. They are not operating beds, are not budgeted for, and are not staffed. They practically all are of temporary construction, remaining from World War II. Their association with operating facilities is solely for security and fire watch. They cost relatively little to maintain and have been retained specifically for use in emergency.

Nowhere in the recitation of "occupancy" figures ranging from 20 to 70 percent is there even a hint of the fact that these statistics are based on total *constructed* bed capacity, including temporary structures held over from World War II, or earlier, as admirably economical insurance against disaster. When actual *operating* beds are considered, as in Table 14 on page 52 of the report of the Hoover Commission Task Force of February 1955, it is seen that in 1954 there was 81 percent occupancy of navy beds and that the average for all the Armed Forces was 72 percent.

The idea advanced in paragraph 4 that new hospital construction constitutes incoordination and waste, disregards the fact that during the period cited (1952-1955) new construction, at least for the Navy, consisted of the replacement of obsolescent hospital facilities. During the same period, constructed navy beds actually decreased by 13,251.

A serious error appears in paragraph 5 in charging "excessive practices" in use of personnel. It is stated that "The technical personnel required to operate these partly used facilities is a drain on the medical and health technicians much needed by our civilian population." The fact is that no technical personnel are being used to operate unused facilities, staffing being related to the patient load, *not* to bed capacity.

Finally, in paragraph 6 many statistics are cited to show that after certain surgical operations military personnel on active duty are hospitalized longer than civilians. No reference is made to the fact that these figures refer to patients discharged in early 1948 before some of the more recent medical advances. More importantly, neither this nor the following paragraph mentions that, whereas a civilian can convalesce at home under the care of his family, military personnel usually cannot be discharged from hospital until fit for at least limited duty.

There is another point which is ignored in these comments and that is that military medical facilities *cannot* be compared to civilian medicine at all points precisely because as a Defense organization they must be, like the firemen and fire engines in our home town, always prepared for a holocaust.

Medical officers should recognize that the American Medical Association, in this instance, is not speaking for all sections of the profession.

B. F. AVERY
Captain (MC) USN
Associate Editor

36 NEW SPECIALISTS IN AVIATION MEDICINE

Thirty-six Medical Corps officers of the U. S. Navy and Air Force have been certified in aviation medicine, following examinations given in Washington, D. C., on 17, 18, and 19 March 1955, according to an announcement by Dr. Ernest L. Stebbins, secretary of the American Board of Preventive Medicine. The new specialists are:

George F. Baier, III, *Col., USAF*
Lynn S. Beals, Jr., *Capt., USN*
Edward L. Beckman, *Comdr., USN*
Laurence A. Bilotta, *Col., USAF*

Robert F. Carmody, *Capt., USN*
Joseph A. Connor, Jr., *Lt. Col., USAF*
Anthony Czerwinski, *Col., USAF*

William A. DeFries, *Lt. Col., USAF*
N. Robert Drummond, *Lt. Col., USAF*

John W. Epton, *Lt. Col., USAF*
Lindsay J. Ervin, *Col., USAF*

Everett C. Freer, *Col., USAF*
Richard L. Fruin, *Capt., USN*

Lucio E. Gatto, *Col., USAF*
George A. Goder, *Lt. Col., USAF*

Philip G. Keil, *Lt. Col., USAF*
Warren E. Klein, *Capt., USN*

Frank H. Lane, *Col., USAF*
Ross B. Lautzenheiser, *Comdr., USN*

Raymond A. Lawn, *Col., USAF*
Emmert C. Lentz, *Col., USAF*

William H. McCarroll, *Col., USAF*

Sherman M. Peabody, *Comdr., USN*
Carl E. Pruett, *Comdr., USN*
Bradley W. Prior, *Lt. Col., USAF*

Courand N. Rothe, *Lt. Col., USAF*

Vance E. Senter, *Comdr., USN*
Jack C. Shrader, *Lt. Col., USAF*
David G. Simons, *Maj., USAF*
Frederick S. Spiegel, *Maj., USAF*
Henry F. Steinbock, *Lt. Col., USAF*

Clarence A. Tinsman, *Col., USAF*

Albert W. Van Sickle, *Lt. Col., USAF*

Hamilton B. Webb, *Lt. Col., USAF*
Carl E. Wilbur, *Comdr., USN*
Paul E. Wright, *Lt. Col., USAF*

DEATHS

SMITH, Edwin Carl, Captain, MC, USAR, Manlius, N. Y.; 548th Medical General Dispensary, Korea; graduated in 1947 from the University of Rochester School of Medicine and Dentistry; appointed a first lieutenant 17 August 1953; ordered to active duty 1 July 1954; died 30 March 1955, age 32, in Korea, of a gunshot wound.

THE MEDICAL OFFICER WRITES

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Reviews of Recent Books

SHOULD YOU DRINK . . ., by *Charles H. Durfee,* Ph. D. 152 pages. The Macmillan Co., New York, N. Y., 1954. Price $2.49.

This small volume is written for and about the problem drinker. It is a warm, understanding book and also an optimistic one, written in nontechnical language, and intended as an informal discussion of the symptoms of compulsive drinking and of rehabilitation through therapy.

Without probing deeply into causes, the author proposes that compulsive drinking is a psychologic problem—a habit system developed through learning, and supported by escape motives. The treatment is then one of re-education in a supportive environment. Such common technics as reassurance and interpretation are used, but certain innovations are also suggested. In the informal atmosphere of a "country inn" the patient engages in congenial occupations, and long, often unscheduled conversations with the therapist. The patient is free to leave if he chooses, return to the city to business obligations, attend social gatherings, and drink alcoholic beverages. The author believes that because the patient must live in a drinking society, he cannot be expected to work through the problem in isolation. Most of the patients, however, voluntarily cease drinking early in therapy.

The professional reader will not find this a satisfying book. Few data are presented, and the outline of the remedial work is so sketchy as to leave most questions unanswered. One wonders how the author's methods would function in a rushed city clinic, or in a class of drinkers who cannot afford to sojourn in the country. These criticisms are not applicable, however, for the book is not intended as a technical treatise. It should provide food for thought as well as hope for the audience to which it is directed. —*HAROLD L. WILLIAMS, Capt., MSC, USA*

THE YEAR BOOK OF OBSTETRICS AND GYNECOLOGY (1954-1955 Year Book Series). Edited by *J. P. Greenhill,* M. D. 544 pages. The Year Book Publishers, Inc., Chicago, Ill., 1954. Price $6.

This is an illustrated abstract of the major portion of the world's literature of the past year concerning obstetrics and gynecology. The editor has selected each article for some important contribution it makes. In addition he discusses and compares them with previous articles and with his own broad experience as teacher and author.

Authors of scientific papers differ in their ideas and conclusions, and even in their statistics, so that anyone who abstracts their articles and contributes his own critique must employ a sense of constructive comparison and a very conservative outlook. This the editor has done

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admirably. He has selected his material from about 40 American and almost an equal number of foreign journals. The *American Journal of Obstetrics and Gynecology,* and *Obstetrics and Gynecology* provide over 150 articles; however, all representative foreign and domestic scientific journals are well represented. An alphabetical subject index and an author index is included.

Among almost 200 papers on obstetrics, the subject of labor, including its management and complications, contributes 75 papers, and pregnancy, its physiology and complications, 94. Of over 175 articles about gynecology, there are more than 40 papers on malignant tumors, and on the subject of infertility almost the same number. Endocrinology has been held to a conservative nine papers.

This yearbook fills a definite need as a handy guide and reference to busy physicians, but, of course, an abstract is not a substitute for the original article.—*EDWARD T. KNOWLES, Capt. (MC) USN*

GROWTH AND DEVELOPMENT OF CHILDREN, by *Ernest H. Watson,* M. D., and *George H. Lowrey,* M. D. 2d edition. 296 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1954. Price $7.

The major improvement of this volume over the first edition is the addition of a chapter on facial growth and development. The chapter includes dentition along with an excellent discourse on malocclusion which should be of considerable interest to the pediatrician.

The chapter on premature development is divided into systems, and the opinions on the causes of prematurity and differences in maturity and immaturity are well done. The chapter on behavior development includes not only the guidance of infancy, preschool period, and childhood, but adolescence as well. The statement that overemphasis of problems in the period of adolescence may do more harm than good may be challenged by some readers. There are 70 figures and 48 tables in the book. Some readers would have preferred fewer height-weight tables for easier reference, but most of the charts are important for a book of this type.

This book should serve a useful purpose for the student and resident as well as for the pediatrician and other clinicians in the branches of medicine closely related to this specialty.

—*SHERL J. WINTER, Capt. (MC) USN*

THE PSYCHOLOGICAL VARIABLES IN HUMAN CANCER, edited by *Joseph A. Gengerelli,* and *Frank J. Kirkner.* 135 pages. University of California Press, Berkeley and Los Angeles, Calif., 1954. Price $3.

This is an edited symposium at the Veterans Administration hospital in Long Beach, Calif. in October 1953. The book is divided into six chapters, each with single authors and usually one or more discussants. It is not indexed, but references appear at the end of each chapter. In reporting research projects considerable psychologic test data with in-

terpretation and discussion are included. The chapter devoted to autonomic functions contains several tables and graphs.

The title is provocative, but nothing is settled by the participants nor does it appear that the intent was such. The significance of the book is that it records experimental data on the subject and reveals the "open mindedness" of the very capable discussants.

The book is stimulating and easy to read. It will undoubtedly be the object of criticism and attack which is traditional for any new approach to cancer research.—*JAMES M. BAILEY, Lt. Col., MC, USA*

TREATMENT OF ACUTE POLIOMYELITIS, edited by *William A. Spencer*, M. D. 134 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1954. Price $3.75.

Anyone who has known the agonizing perplexity of treating the patient with bulbar poliomyelitis will keenly appreciate this synopsis which is based on experiences with 1,000 patients with "suspected" poliomyelitis admitted to the Southwestern Poliomyelitis Respiratory Center in Houston. Of these, 246 were ultimately classified as severely ill with poliomyelitis. The acute and postacute phases of the disease are discussed in detail. Most of this book is devoted to the diagnosis and care of patients with respiratory complications and particular emphasis is given to the use of the various types of respirators currently available. The care of the patient with tracheotomy, indications for this procedure, and the problems involved in its termination, are well summarized. Most of this information will be helpful in the management of patients with or without tracheotomy requiring care in a respirator. The sections concerning metabolic and circulatory complications leave something to be desired, but this is more a reflection on the general state of knowledge in the field than on the editor or the contributors, who are to be congratulated on the emphasis which they have given to the diagnosis and management of the emotional and social aspects of the disease.

The volume is inexpensively bound. The material is presented as a series of synoptic tables accompanied by cursory notes of explanation. There is a useful appendix which includes tables of average ventilatory requirements, salt and water requirements, muscle reeducation programing, muscle testing, and programs for maintenance of joint range of motion. A bibliography of 24 references is included. The book is of interest and importance as a guide to all those not fully acquainted with the care of the seriously ill patient with poliomyelitis, particularly interns and junior residents assigned to medical and pediatric services.—*JOHN K. SPITZNAGEL, Maj., MC, USA*

INTERN'S MANUAL by *Arthur Bernstein*, M. D. 292 pages; illustrated. Year Book Publishers, Inc., Chicago, Ill., 1954. Price $3.

This small paper-bound book is the manual for interns at the Cook County Hospital in Chicago and represents a guide to the care of pa-

tients by the house staff of that institution. The author has organized the subjects alphabetically and uses many cross references to avoid repetition.

A remarkable amount of information, much in outline form, is contained in this manual. The topics covered are many and varied, and include such diverse subjects as blood dyscrasias, anesthesia, fractures, burn therapy, et cetera, thus representing the matters important to a house officer in the treatment of patients with routine as well as emergency conditions. Certain instructions may not apply so well to other institutions, but this does not detract from the value of the manual. The section on fractures is particularly well done, concise, and complete, and is one feature that other house staff manuals often omit or cover only sketchily.

As a house staff manual this book is excellent and may be profitably used by all physicians for ready reference in emergencies, laboratory procedures, antidotes, fractures, and many other phases of medicine. It is small enough to fit easily into the doctor's medical bag.

—DAVID L. DEUTSCH, Lt. Col., MC, USA

HUMAN LIMBS AND THEIR SUBSTITUTES, by *Paul E. Klopsteg,* Ph. D., Sc. D., and *Philip D. Wilson,* M. D. 844 pages; illustrated. McGraw-Hill Book Co., Inc., New York, N. Y., 1954. Price $12.

This book is a report of the research and development program in artificial limbs conducted under the direction of the National Research Council since 1945. The text represents the combined efforts of 30 experts, including surgeons, engineers, physiologists, psychologists, therapists, prosthetists, chemists, and manufacturers. As a result of this comprehensive research and development program, the latest components, mechanisms, and prosthetic methods are described. All aspects of the management of an amputee, including a definition of the problem, the team approach, the preoperative and surgical care, pain patterns, psychological adjustment, and fitting of and training for use of prostheses, are discussed. The influence of improved prostheses on sites of amputation is emphasized, cineplastic technics and fittings for the upper extremity are discussed, and the suction socket prosthesis for the lower extremity is fully evaluated.

The text is amply illustrated with graphs, line drawings, and half tones. The text is written in clear, not too technical, language which makes it easy to read. A few minor errors in indexing and labeling do not detract in any way from the book which, in general, is well indexed. Each section is augmented by an excellent bibliography. All interested in the problem of amputations should find this an instructive and valuable reference book which should be in the library of all those who have the occasion to participate in any phase of the management of amputees. *—JOSEPH W. BATCH, Col., MC, USA*

SUPERVISION OF NURSING SERVICE PERSONNEL, by *Cecilia M. Perrodin*, R. N., M. S. De Paul University, Chicago, Ill. 622 pages; illustrated. The Macmillan Co., New York, N. Y., 1954.

Supervision, thoroughly understood and intelligently employed, is a vital factor in providing the most effective nursing care in both large and small hospitals. In this book the author has "clarified the need, principles, technic, and values of supervision in nursing service."

The purposes of this book are to demonstrate the nurse supervisor's role as a "harmonizer and key figure" between the administration on the one hand and the nursing personnel and patients on the other; to serve as a guide to hospital and nursing administrators, supervisors, and teachers in this "age of supervision"; and to aid the student in nursing education programs by providing reference material on supervision as differentiated from administration.

The book is well written. Following each of the eight parts is an extensive bibliography to facilitate and encourage further reading and study. The discussions include the philosophy of supervision and the significance of psychology, sociology, and leadership; the principles, both general and specific, of supervision; the contribution of education, business, and industry; and the results of good supervision as seen in patient satisfaction, personnel stimulation and growth, administrative gains, good public response, and the growth of the supervisor and supervision.

Nursing administrators, supervisors, and educators will find this a valuable guide in developing and maintaining an effective supervisory program. To the student in nursing education and administration it will provide a much needed reference for supervision as it applies to the nursing service.—*AILEEN E. BRIMMER, Maj., USAF (AFNC)*

THE BANE OF DRUG ADDICTION, by *Orin Ross Yost*, M. D. 155 pages. The Macmillan Co., New York, N. Y., 1954. Price $4.

This book deals with the evils of drug addiction as they affect our civilization today. It is well organized and amply documented with vivid, selected, case histories from the files accumulated by the author during 25 years of professional experience with a great number of addicts.

The underlying causes of addiction are emphasized and the medical profession is challenged to recognize the condition as a disease, requiring prompt and proper treatment. The danger of spreading the disease, especially among adolescents, is pointedly described. The habit-forming drugs are classified and the criteria of addiction defined, with illustrations by tables and outlines. The symptoms of addiction and the abstinence syndrome are adequately presented.

The chapter on treatment outlines the steps of withdrawal, rehabilitation, and re-education. In view of the difficulty of carrying out these

measures and the high rate of relapses, coupled with the all too frequent interference of relatives and friends, the author concludes that "regardless of the particular drug, very few cases of drug addiction of long standing in adults are permanently cured." Consequently the real cure lies in prevention. The social, moral, medical, legal, and penal measures required for control of drug addiction are discussed in the last chapter. The book is easy to read and the format is excellent. There is an adequate glossary of the jargon of addicts, and the index is complete. The book is recommended to all physicians for information and reference in the diagnosis and treatment of drug addiction. —*DAVID C. GAEDE, Capt. (MC) USN*

THE PYRAMIDAL TRACT, by *A. M. Lassek*, M. D., Ph. D. American Lecture Series, Publication Number 233, A Monograph in The Bannerstone Division of American Lectures in Anatomy. Edited by *Otto F. Kampmeier*, Ph. D., M. D. 166 pages. Charles C Thomas, Publisher, Springfield, Ill., 1954. Price $4.75.

The author's stated purpose in this monograph is "to collect and correlate the known facts on the pyramidal bundle in an attempt to ascertain its true status in medicine." As he says "it was one of the first fasciculi to be observed in man" and it "was assigned a major function." The results of numerous investigations over many years did not greatly alter the original concept of the tract until recently.

In the early chapters the author describes the speculation over the centuries as to the reasons for paralysis contralateral to the side of brain damage. Then the history of the next 160 years, concerning the gross observations and dissections of the tract is briefly discussed. Following this, chapters are devoted to an historical account of histologic studies of the normal tract and an account of efforts to understand the pathologic lesions of this tract. The traditional signs and symptoms of pyramidal tract disease, surgical operations involving the tract, and the results of animal experiments are then related. Also included are outlines of basic pyramidal tract investigations in man and in animals and bibliography of 299 references.

Physicians concerned with paralysis secondary to disorders of the nervous system will find this small book of considerable interest.

—*JOHN W. KEMBLE, Col., MC, USA*

SENTENCE COMPLETION, by *James Quinter Holsopple*, and *Florence R. Miale*. American Lecture Series, Publication Number 230, A Monograph in The Bannerstone Division of American Lectures in Psychology, edited by *Molly Harrower*, Ph. D. 177 pages. Charles C Thomas, Publisher, Springfield, Ill., 1954. Price $5.50.

This monograph is an initial report on a new type of test in which the authors have selected 73 incomplete sentences "which seem to call for relatively impersonal responses rather than for report on personal problems." After a brief discussion of the criteria used for selection of the statements, a list follows of characteristic completions for each statement, based on results obtained from 1,700 persons. The

technic of interpretation is demonstrated by a detailed analysis of one record and the presentation of 27 illustrative records from a wide variety of psychiatric patients.

The use of indirect beginning of a sentence does not threaten the person as much as the direct type of opening, and he is encouraged to give a wide variety of expression. This makes the test more flexible and produces more projective material than previous sentence completion tests. On the other hand, the flexibility of the test reduces its objectivity, and it will be difficult to determine the validity or reliability of the conclusions drawn from a single record. The authors are aware of this situation, but take the view that the validity and reliability of projective technics depend on the skill and training of the examiner using the technic.

The book presents interesting test material which indicates the test can be an effective, economical instrument in the hands of an experienced clinician. Its simplicity and minimum of structured material, however, may be pitfalls for the inexperienced examiner.

—FRANK J. HAMMER, Capt., MSC, USA

FLUID THERAPY, by *James D. Hardy*, M. D. 255 pages; 77 illustrations. Lea & Febiger, Philadelphia, Pa., 1954. Price $5.50.

The author has succeeded in presenting a concise discussion of total fluid therapy. The book consists of 19 chapters, with chapter 1 devoted to the general physiology of body fluid metabolism. In a clear and simple manner there follows a discussion of fluid therapy that presents a classification of states of water and electrolyte imbalance, and methods to diagnose and treat these derangements.

Special chapters are devoted to the management of clinical problems of fluid imbalance. Included are chapters on intestinal obstruction, burns, fluid therapy in infants, children, and elderly persons, and problems peculiar to urology, neurosurgery, and orthopedics.

Nothing new or startling has been presented in this book. The reader is informed how to decide when a state of fluid imbalance exists and then is given a practical guide to therapy. The table of contents, a detailed outline of subject matter in each chapter, and adequate references will provide students, interns, residents, and practitioners of the medical and surgical specialties with a ready source of reference to all aspects of fluid therapy. *—GEORGE F. PEER, Col., MC, USA*

STELLATE GANGLION BLOCK, by *Daniel C. Moore*, M. D. 280 pages. Charles C Thomas, Publisher, Springfield, Ill., 1954. Price $10.50.

This is a first edition of a text concerning the technics for interruption of nerve impulses from the cervicothoracic sympathetic ganglion. The fundaments of the anatomy and physiology of the cervicothoracic portions of the sympathetic nervous system are discussed including the necessary equipment, various types of drugs, and ancillary diag-

nostic equipment needed. The second part includes the technics used by the author and the signs and symptoms of a technically successful block.

An important chapter on complications outlines problems relevant to patient response to drugs, errors in technic, and inadvertent involvement of adjacent structures in the field of injection. Part three of the volume ascribes the use of these technics as applicable to diagnostic and therapeutic problems in more than 50 disease conditions associated with (1) vascular disturbances of brain, heart, lung, upper extremities, and face; (2) overactivity of sweat and mucous glands; (3) bronchiospastic conditions; and (4) cardiac arrhythmias of sympathetic derivation. The technics of stellate ganglion block used by 33 other authors are described in their original details.

The illustrations, colored and black and white plates, are in excellent detail, accurate, expressive in design and purpose and follow the text so as to be useful. The index and bibliographies are very satisfactory. This text is adequate for the novice who may wish to learn the technics of stellate ganglion block as well as for the consultant who may wish to become better informed as to the many possibilities in the application of this diagnostic and therapeutic instrument.

—*HARVEY C. SLOCUM, Col., MC, USA*

STANDARD VALUES IN NUTRITION AND METABOLISM, edited by *Errett C. Albritton,* M. D. 380 pages. W. B. Saunders Co., Philadelphia, Pa., 1954.

This book is a compendium of 160 tables of biologic data prepared by a large group of experts organized under U. S. Government auspices. There are 223 pages of tables and 16 pages of diagrams, with thousands of items of quantitative data and their bibliographic references. Much of the information deals with animals, plants, and microorganisms, although human data are also included.

This book represents a gigantic effort at correlating metabolic and nutritional information from the world's literature, and as such will be indispensable to the advanced research worker.

—*S. O. WAIFE, Lt. (MC) USNR*

PSYCHIATRY AND COMMON SENSE, by *C. S. Bluemel,* M. D. 259 pages. The Macmillan Co., New York, N. Y., 1954. Price $3.

This book is written to make the various emotional illnesses more understandable to the layman. In order to do this, the author describes all psychiatric disorders in terms of organization, disorganization, and nonorganization of the personality.

The early chapters discuss personality development, including the behavioral disorders, some organic syndromes, and some psychoses, and immaturity and other neurotic and psychotic disorder. Other chapters discuss psychosomatic disorders, psychoses, and alcoholism. In the latter chapter the author claims that "58 percent of 550 patients

remained sober under antabuse therapy. Another 20 percent had one or more relapses, then received antabuse and remained sober. Thus the treatment was 78 percent effective." This suggests a more optimistic view of this problem than that voiced by other authors, and might possibly be clarified if the author indicated his method of selection of patients, his follow-up procedures, and the time interval.

The chapter on treatment is an orientation toward understanding and avoiding emotional disorders. Some comments may raise an occasional eyebrow, as, for example, "It would seem, then, that the seeds of paranoid thinking are to be avoided."

In the final chapter the author discusses the personality of men in politics. The reviewer found little relationship between this chapter and the rest of the book, and wondered how the observation that dominant persons tend toward positions of leadership contributes toward the implementation of his suggestion that certain types of "wise and mature men" might make sounder politicians.

While this book may have some value to the layman and possibly to the nurse who wishes a general orientation to psychiatry, I believe that it has little usefulness to the psychiatrist or to physicians in other fields. For the rare occasion when the patient is to be advised to read about psychiatry there are several other books which might be more suitable for this purpose, and which present the concepts of psychiatry in a clearer fashion. —*WILLIAM HAUSMAN, Maj., MC, USA*

CLINICAL ORTHOPAEDICS, by *Anthony F. DePalma,* Editor. 240 pages; illustrated. J. B. Lippincott Co., Philadelphia, Pa., 1954. Price $7.50.

This is the fourth of a series of publications which is sponsored by the Association of Bone and Joint Surgeons. To be fully appreciated, it must be remembered that each volume represents only a limited part of a long-range plan designed to provide an outlet for orthopedic material of interest and to augment other channels of literature.

The book is divided into a section on joint fractures and dislocations and one on general orthopedic subjects. In general each subject is well presented, adequately illustrated, and where applicable, followed by an excellent bibliography. One who keeps abreast of current literature may be justly critical of the two articles on fractures of the patella which add little to this subject. Garrett Pipkin uses seven pages to discuss dislocation of the carpal lunate and a presumptive test for reduction. He de-emphasizes the value of good roentgenography in the management of this injury. Juan Farill describes still another method of treatment of congenital dislocation of the hip and admits the inadequacy of follow-up studies in his patients. Francis W. Glenn's article on the antibiotics and chemotherapeutic drugs, and Harry C. Stein's discussion of preservation of foot function are excellent. These two articles are both highly informative and thought-provoking and will probably be read and reread with great interest by all who may

have access to them. W. M. Deyerle and V. R. May present an excellent discussion of the sciatic nerve syndrome and describe a new and simple test which should prove to be a useful adjunct in the diagnosis of this condition.

As in the case of each of the preceding publications of this series, this volume complements the editor's plan and justifies a place for this type of publication in the field of orthopedic literature.

—ALFRED A. GREBE, Col., MC, USA

THE YEAR BOOK OF PEDIATRICS (1954-1955 Year Book Series), edited by *Sidney S. Gellis*, M. D. 431 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1954. Price $6.

The most recent edition of this volume is composed of condensations of leading and timely articles pertinent to pediatrics published from June 1953 through May 1954. The material selected is divided into 18 broad categories, including the system review, specialties which involve child care, and topics peculiar mainly to pediatrics, such as immunity.

As the editor has impartially selected articles with contrasting opinions concerning the same topic, the grouping arrangement enables the reader more easily to compare and evaluate for himself the current theories and findings. The benefit of this type of presentation to the physician and general practitioner over the usual random comparison one makes by reading month by month, and recalling vaguely opinions expressed in preceding articles, cannot be overestimated. Many controversial and outstanding articles are further discussed by leaders in that particular field and, in summation, commented on by the editor. The selection of discussors is to be commended, as their frank opinions, presented in conversational tones, effect a "seminar" touch to the text.

This volume is valuable not only as a time-saving condensation, but also as an aid to weighing and comparing the recent trends in pediatrics. It is assumed that every pediatrician, as well as all other physicians involved in the care of children, will avail himself of this book.

—ARTHUR C. DIETRICK, Maj., USAF (MC)

TEXTBOOK OF MICROBIOLOGY, by *William Burrows*, Ph. D.; with the collaboration of *Francis Byron Gordon*, Ph. D, M. D.; *Richard Janvier Porter*, Ph. D.; and *James William Moulder*, Ph. D. 16th edition. 824 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1954.

So many advances have been made in recent years in the field of microbiology that virtually every page of this well-known text has been modified or rewritten in the preparation of this edition.

The first section consists of a series of chapters on the general aspects of microbiology, particularly bacteriology, including such subjects as the history of microbiology, laboratory methods, and the morphology and physiology of bacteria, followed by chapters on the mode of action of antibacterial substances, and the variation and classification of bacteria. Subsequent to sections on epidemiology and on

the bacteriology of water, sewage, and food are two chapters on immunity. The various pathogenic bacteria are discussed in natural groups. A chapter on parasitology is followed by one in which the rickettsiae are first described in a general manner and then by the diseases they cause. The second of two chapters on viruses describes the various viral diseases, while the last section of the book concerns bacteriophage.

Diagnostic methods, chemotherapeutic and other measures recommended are up to date, and great care was taken to exclude those compounds which have not yet been adequately tested. The authors seem to have wisely concluded that symptomatology and pathology are beyond the scope of this type of text and have refrained from prescribing specific dosages when recommending chemotherapeutic agents. The book is sufficiently documented so that the reader can ascertain the source of certain textual material and secure additional information.

As a result of the condensation necessary to reduce the enormous amount of information available into a book-sized parcel, it seems inevitable that a few incongruities and ambiguous statements should have appeared. Thus, in the table on rickettsial diseases of man, the following "vectors" are listed: *Polyplax spinulosa* (for murine typhus), *Haemaphysalis* (for spotted fever) and *Trombicula schuffneri* (for scrub typhus). This is misleading, because the first two arthropods are only involved in the transmission of the rickettsiae from animal to animal and not to man, while *T. schuffneri* has been suspected as a vector, but not proved to be one. The text is also ambiguous on this score, for in writing of murine typhus, the authors state that the "disease is transmitted from rat to rat and from rat to man by the rat flea *Xenopsylla cheopis* and by the rat louse *P. spinulosa.*"

The chapters on the virus diseases provide a current and succinct summary of the diseases generally mentioned in the Anglo-American literature, but it is regrettable that the hemorrhagic fevers of the Soviet Union were merely mentioned in passing rather than discussed in detail.

This book, which is attractively prepared and printed, and well illustrated, will be a most valuable tool for the laboratory and field worker in microbiology—*ROBERT TRAUB, Lt. Col., MSC, USA*

SURGERY OF THE ELBOW, by *Frederick M. Smith,* M. D. 340 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1954. Price $10.75.

This comprehensive monograph fills a void which has long existed in orthopedic literature. Here, for the first time under one cover, are discussed congenital and acquired lesions of the elbow that are amenable to surgical treatment or to a combination of surgical, physical, and radiologic therapy. Trauma of the elbow, from gunshot wounds to the occupational bursitis seen in baseball pitchers, is considered as well as nontraumatic conditions such as congenital defects, neoplasms, infections, and paralyses. Indications for operation, surgical

approaches, and details of operations are discussed where indicated; contraindications for surgical treatment are also emphasized where necessary. In addition, there is a chapter on anesthesia and one considering the whole patient which discusses the interrelationship of age, sex, occupation, economic status, and morale as affecting type of treatment.

Aside from the scientific content, other factors contribute to the value of the book. The type is large, and illustrations consisting of photographs, roentgenograms, and line drawings are numerous and appropriate. The line drawings, in particular, are excellent and are used propitiously. The subject matter is classified wherever possible. The bibliography appearing at the end of the book is divided into general headings, making it easy for the reader to obtain references.

The book is thorough, clear, and concise. The author establishes rapport with his reader by bringing into the context matters of practical interest; for example, what can or may happen with good or poor treatment, and how to avoid as well as correct certain deformities. This book is an important monograph and is recommended without reservation to all physicians who do operations on the extremities.

—*JOHN D. ASHBY, Lt. Col., MC, USA*

NERVE BLOCKS, A Manual of Regional Anesthesia for Practitioners of Medicine, by *John Adriani*, M. D. 265 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1954. Price $6.50.

In this compact, informative volume, it is predicated that the current trend to use nerve blocks for diagnostic and therapeutic purposes is increasing and that physicians in all phases of medical practice are using these technics. This manual's design is not only excellent for those who perform an occasional block, but also contains adequate and accurate material as a ready reference for the specialist.

The book is written entirely in outline form, presenting each type of nerve block by definition, use, brief anatomic description, technic, and distribution of analgesia. Sketches and photographs are used freely to illustrate the text. In this manner, the general considerations of regional anesthesia are described in sufficient detail for the beginner. Paravertebral, cranial, peripheral, spinal, and epidural regional blocks are presented in the order listed, and the most common approach, as well as one or two alternate methods, is described. The illustrations are adequate, clear, and properly located. The bibliography is brief, but adequate for the scope of this work.

The author is a recognized authority on anesthesiology and has written many texts on the various aspects of this specialty. He has ably accomplished his aim of presenting information in a comprehensive manner. This is a valuable book for students, for those who perform an occasional nerve block, and for ready reference for the experienced anesthesiologist.—*JAMES G. INMAN, Col., MSC, USA*

New Books Received

Books received by the *U. S. Armed Forces Medical Journal* are acknowledged in this department. Those of greatest interest will be selected for review in a later issue.

ANTIBIOTICS ANNUAL 1954-1955, Proceedings of the Second Annual Symposium on Antibiotics, edited by *Henry Welch*, Ph. D., and *Felix Martí-Ibañez*, M. D. Second Annual Symposium on Antibiotics Chairman: *Henry Welch*, Ph. D., Director, Division of Antibiotics, Food and Drug Administration. Sponsored by U. S. Department of Health, Education and Welfare, Food and Drug Administration, Division of Antibiotics. In Collaboration with the Journal of Antibiotics & Chemotherapy, October 25-29, 1954, Washington, D. C. 1,154 pages; including graphs, tables, and colored illustrations. Medical Encyclopedia, Inc., New York, N. Y., 1955. Price $10.

THE SKIN, A Clinicopathologic Treatise, by *Arthur C. Allen*, M. D., Associate Pathologist, Memorial Hospital; Associate Attending Pathologist, Memorial Cancer Center, New York City; Associate Professor of Pathology, Cornell University Medical School, Sloan-Kettering Division; Consultant Pathologist, Bronx Veterans Administration Hospital; Consultant Pathologist, New York Infirmary. 1,048 pages; 495 full-page illustrations; frontispiece in color. The C. V. Mosby Co., St. Louis, Mo., 1954. Price $25.

THE YEAR BOOK OF NEUROLOGY, PSYCHIATRY AND NEUROSURGERY (1954-1955 Year Book Series). Neurology, edited by *Roland P. Mackay*, M. D., Professor of Neurology, University of Illinois; Attending Neuropsychiatrist, St. Luke's Hospital, Chicago; Psychiatry, edited by *S. Bernard Wortis*, M. D., Professor of Psychiatry and Neurology and Director of Psychiatric and Neurologic Services, University Hospital, New York University-Bellevue Medical Center; Neurosurgery, edited by *Percival Bailey*, M. D., Distinguished Professor of Neurology and Neurological Surgery, University of Illinois, and *Oscar Sugar*, M. D., Associate Professor of Neurological Surgery, University of Illinois. 619 pages; 97 figures. The Year Book Publishers, Inc., Chicago, Ill., 1955. Price $7.

THE YEAR BOOK OF ORTHOPEDICS AND TRAUMATIC SURGERY (1954-1955 Year Book Series). Edited by *Edward L. Compere*, M. D., F. A. C. S., F. I. C. S., Professor and Chairman, Department of Bone and Joint Surgery, Northwestern University Medical School; Senior Attending Orthopedic Surgeon and Chairman, Department of Orthopedic Surgery, Wesley Memorial Hospital; Consultant Orthopedic Surgeon, Chicago Memorial, Augustana, Henrotin and Veterans Administration Research Hospitals. 384 pages; 193 illustrations. The Year Book Publishers, Inc., Chicago, Ill., 1955. Price $6.

REFLECTIONS ON RENAL FUNCTION, by *James R. Robinson*, M. D., Ph. D., (Cantab.) Assistant Director of Research, Department of Experimental Medicine, Medical Research Council and University of Cambridge, Fellow and Assistant Tutor of Emmanuel College. 163 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1954. Price $3.50.

THE LUNG, Clinical Physiology and Pulmonary Function Tests (Based on the 1954 Beaumont Lecture), by *Julius H. Comroe, Jr.*, M. D., Professor of Physiology and Pharmacology; *Robert E. Forster, II*, M. D., Associate Professor of Physiology and Lowell M. Palmer Senior Fellow; *Arthur B. Dubois*, M. D., Assistant Professor of Physiology; *William A. Briscoe*, M. D., Associate in Physiology; and *Elizabeth Carlsen*, A. B., Isaac Ott Fellow in Physiology; Graduate School of Medicine, University of Pennsylvania. 219 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1955. Price $5.50.

DIFFERENTIAL DIAGNOSIS OF INTERNAL DISEASES. Clinical Analysis and Synthesis of Symptoms and Signs on Pathophysiologic Basis, by *Julius Bauer*, M. D., F. A. C. P., Clinical Professor of Medicine, College of Medical Evangelists, Los Angeles; Senior Attending Physician, Los Angeles County General Hospital; Consultant in Medicine, Long Beach Veterans Administration Hospital. 2d edition, revised and enlarged. 987 pages; illustrated. Grune & Stratton, Inc., New York, N. Y., 1955. Price $15.

COLD INJURY, Transactions of the Third Conference, February 22, 23, 24, and 25, 1954. Fort Churchill, Manitoba, Canada, edited by *M. Irené Ferrer*, M. D., Associate Professor of Clinical Medicine, Columbia University College of Physicians and Surgeons, New York, N. Y. 226 pages; illustrated. Sponsored by the Josiah Macy, Jr. Foundation, New York, N. Y., 1955. Printed in the United States of America by Madison Printing Co., Madison, N. J. Price $4.50.

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